kontron

»Kontron User's Guide«

KTC5520/EATX

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Customer Service

Contact Information:

Kontron Canada, Inc.
4555 Ambroise-Lafortune
Boisbriand, Québec, Canada
J7H 0A4
Tel: (450) 437-5682
(800) 354-4223
Fax: (450) 437-8053
E-mail: support@ca.kontron.com

Kontron Modular Computer GMBH
Sudetenstrasse 7
87600 Kaufbeuren
Germany
+49 (0) 8341 803 333
+49 (0) 8341 803 339
support-kom@kontron.com

Visit our site at: www.kontron.com

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Kontron reserves the right to make changes without notice in product or component design as warranted by evolution in user needs or progress in engineering or manufacturing technology. Changes that affect the operation of the unit will be documented in the next revision of this user's guide.

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Safety Instructions

Before You Begin

Before handling the board, read the instructions and safety guidelines on the following pages to prevent damage to the product and to ensure your own personal safety. Refer to the "Advisory Convention" section in the Preface for advisory conventions used in this user's guide, including the distinction between Warnings, Cautions, Important Notes, and Notes.

- Always use caution when handling/operating the computer. Only qualified, experienced, authorized electronics service personnel should access the interior of the computer. The power supplies produce high voltages and energy hazards, which can cause bodily harm.
- Use extreme caution when installing or removing components. Refer to the installation instructions in this user's guide for precautions and procedures. If you have any questions, please contact Kontron Technical Support

WARNING

High voltages are present inside the chassis when the unit's power cord is plugged into an electrical outlet. Turn off system power, turn off the power supply, and then disconnect the power cord from its source before removing the chassis cover. Turning off the system power switch does not remove power to components.

Preventing Electrostatic Discharge

Static electricity can harm system boards. Perform service at an ESD workstation and follow proper ESD procedure to reduce the risk of damage to components. Kontron strongly encourages you to follow proper ESD procedure, which can include wrist straps and smocks, when servicing equipment.

Take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component's antistatic packing material until you are ready to install the component in a computer. Just before unwrapping the antistatic packaging, be sure you are at an ESD workstation or grounded. This will discharge any static electricity that may have built up in your body.
- When transporting a sensitive component, first place it in an antistatic container or packaging.
- Handle all sensitive components at an ESD workstation. If possible, use antistatic floor pads and workbench pads.
- Handle components and boards with care. Don't touch the components or contacts on a board. Hold a board by its edges.
- Do not handle or store system boards near strong electrostatic, electromagnetic, magnetic, or radioactive fields.

Working with Batteries

Care and Handling Precautions for Lithium Batteries

Your computer board has a standard, nonrechargeable lithium battery.

- Do not short circuit
- Do not heat or incinerate
- Do not charge
- Do not deform or disassemble
- Do not apply solder directly
- Always observe proper polarities

Replacing Lithium Batteries

Exercise caution while replacing lithium batteries!

WARNING

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries, following manufacturer's instructions.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabriquant.

ACHTUNG

Explosionsgefahr bei falschem Batteriewechsel. Verwenden Sie nur die empfohlenen Batterietypen des Herstellers. Entsorgen Sie die verbrauchten Batterien laut Gebrauchsanweisung des Herstellers.

ATENCION

Puede explotar si la pila no este bien reemplazada. Solo reemplazca la pila con tipas equivalentes segun las instrucciones del manifacturo. Vote las pilas usads segun las instrucciones del manifacturo.

Preface

How to Use This Guide

This user's guide is designed to be used as step-by-step instructions for installation, and as a reference for operation, troubleshooting, and upgrades.

For the circuits, descriptions and tables indicated, Kontron assumes no responsibility as far as patents or other rights of third parties are concerned.

The following is a summary of chapter contents:

- Chapter 1, Product Description
- Chapter 2, Board Features
- Chapter 3, Installing the board
- Chapter 4, Management
- Chapter 5, Software Setup
- Appendix A, PCI IDSEL and Device Numbers
- Appendix B, BIOS Setup Error Codes
- Appendix C, Software Update & Drivers
- Appendix D, Troubleshooting
- Appendix E, Getting Help
- Appendix F, Recycling your Board
- Appendix G, Glossary

Customer Comments

If you have any difficulties using this user's guide, discover an error, or just want to provide some feedback, please send a message to: Tech.Writer@ca.kontron.com. Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user's guide on our Web site. Thank you.

Advisory Conventions

Seven types of advisories are used throughout the user guides to provide helpful information or to alert you to the potential for hardware damage or personal injury. They are Note, Signal Paths, Jumpers Settings, BIOS Settings, Software Usage, Cautions, and Warnings. The following is an example of each type of advisory. Use caution when servicing electrical components.

Note:
Indicates information that is important for you to know.

Signal Path:
Indicates the places where you can find the signal on the board.

Jumper Settings:
Indicate the jumpers that are related to this sections.

BIOS Settings:
Indicates where you can set this option in the BIOS.

Software Usage:
Indicates how you can access this feature through software.

CAUTION
Indicates potential damage to hardware and tells you how to avoid the problem.

WARNING
Indicates potential for bodily harm and tells you how to avoid the problem.

ESD Sensitive Device:
This symbol and title inform that electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.
Please read also the section "Special Handling and Unpacking Instructions".

CE Conformity:
This symbol indicates that the product described in this manual is in compliance with all applied CE standards. Please refer also to the section "Regulatory Compliance Statements" in this manual.

Disclaimer: We have tried to identify all situations that may pose a warning or a caution condition in this user's guide. However, Kontron does not claim to have covered all situations that might require the use of a Caution or a Warning.

Unpacking

Follow these recommendations while unpacking:

- Remove all items from the box. If any items listed on the purchase order are missing, notify Kontron customer service immediately.
- Inspect the product for damage. If there is damage, notify Kontron customer service immediately.
- Save the box and packing material for possible future shipment.

Regulatory Compliance Statements

FCC Compliance Statement for Class A Devices

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generated, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experience radio/TV technician for help.

WARNING

This is a Class A product. If not installed in a properly shielded enclosure and used in accordance with this User's Guide, this product may cause radio interference in which case users may need to take additional measures at their own expense.

Safety Certification

All Kontron equipment meets or exceeds safety requirements based on the IEC/EN/UL/CSA 60950-1 family of standards entitled, "Safety of information technology equipment." All components are chosen to reduce fire hazards and provide insulation and protection where necessary. Testing and reports when required are performed under the international IECEE CB Scheme. Please consult the "Kontron Safety Conformity Policy Guide" for more information.

CE Certification

The product(s) described in this user's guide complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques. Although Kontron offers accessories, the customer must ensure that these products are installed with proper shielding to maintain CE compliance. Kontron does not offer engineering services for designing cabling systems. In addition, Kontron will not retest or recertify systems or components that have been reconfigured by customers.

Limited Warranty

Kontron grants the original purchaser of Kontron's products a TWO YEAR LIMITED HARDWARE WARRANTY as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of Kontron are valid unless the consumer has the express written consent of Kontron.

Kontron warrants their own products, excluding software, to be free from manufacturing and material defects for a period of 24 consecutive months from the date of purchase. This warranty is not transferable nor extendible to cover any other users or long- term storage of the product. It does not cover products which have been modified, altered or repaired by any other party than Kontron or their authorized agents. Furthermore, any product which has been, or is suspected of being damaged as a result of negligence, improper use, incorrect handling, servicing or maintenance, or which has been damaged as a result of excessive current/voltage or temperature, or which has had its serial number(s), any other markings or parts thereof altered, defaced or removed will also be excluded from this warranty.

If the customer's eligibility for warranty has not been voided, in the event of any claim, he may return the product at the earliest possible convenience to the original place of purchase, together with a copy of the original document of purchase, a full description of the application the product is used on and a description of the defect. Pack the product in such a way as to ensure safe transportation.

Kontron provides for repair or replacement of any part, assembly or sub-assembly at their own discretion, or to refund the original cost of purchase, if appropriate. In the event of repair, refunding or replacement of any part, the ownership of the removed or replaced parts reverts to Kontron, and the remaining part of the original guarantee, or any new guarantee to cover the repaired or replaced items, will be transferred to cover the new or repaired items. Any extensions to the original guarantee are considered gestures of goodwill, and will be defined in the "Repair Report" issued by Kontron with the repaired or replaced item.

Kontron will not accept liability for any further claims resulting directly or indirectly from any warranty claim, other than the above specified repair, replacement or refunding. In particular, all claims for damage to any system or process in which the product was employed, or any loss incurred as a result of the product not functioning at any given time, are excluded. The extent of Kontron liability to the customer shall not exceed the original purchase price of the item for which the claim exists.

Kontron issues no warranty or representation, either explicit or implicit, with respect to its products reliability, fitness, quality, marketability or ability to fulfil any particular application or purpose. As a result, the products are sold "as is," and the responsibility to ensure their suitability for any given task remains that of the purchaser. In no event will Kontron be liable for direct, indirect or consequential damages resulting from the use of our hardware or software products, or documentation, even if Kontron were advised of the possibility of such claims prior to the purchase of the product or during any period since the date of its purchase.

Please remember that no Kontron employee, dealer or agent is authorized to make any modification or addition to the above specified terms, either verbally or in any other form, written or electronically transmitted, without the company's consent.

Chapter 1

Product Description

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1. Product Description

1.1 Product Overview

Designed with an extensive feature-set and two new Intel® Xeon® processor 5500 series quad-core processors, the cost-effective Kontron KTC5520-EATX SSI EEB-compliant server board offers extreme performance, high I/O bandwidth and exceptional reliability. This Kontron server board is expected to serve OEMs in the designing of multiple applications found in the medical imaging, simulation, storage and multimedia telecom and data center markets.

An attractive selling point for network managers is the server board's built-in ability to be fully managed remotely.Kontron uses an Integrated Management Processor (IMP) that integrates VGA/2D, Baseboard Management Controler (BMC), and a Keyboard, Video, Mouse / Virtual Media (KVM/VM) emulator over IP to support real-time access from any computer, anywhere. Intelligent Platform Management Interface (IPMI) 2.0 compliant using IPMI over LAN, the server board provides the OS-independent and cross-platform interface for monitoring the server system's temperature, voltage, and fan status, among other items, and permits out-of-band management even when the main processors are not powered-in.

KVM over IP gives the possibility to work on the server and troubleshoot it from anywhere if there is any problem. The VM over IP allows administrators to get a virtual local drive to target servers from a remote drive (floppy, CD/DVD-ROM, flash device, HDD). With this tool, it is possible to install software/OS remotely for convenient installation. IPMI proactively sends alarms about environmental issues that could threaten the server's services, therefore reducing system downtime and operation costs.

Among an incredible feature-set, the Kontron KTC5520-EATX server board provides one dual port GbE controller, eight USB 2.0 ports, four of them are accessible internally through two 9 pins headers; one of these header is compliant with USB flash drive mezzanine, one TPM 1.2 header, one PCI 32 bits/33 MHz slot, one PCI-Express x4 Gen1 and four x8 PCI-Express Gen2 slots. It also features six SATA II connectors, seven fan headers, VGA, legacy PS/2 keyboard/mouse and HD audio interfaces.

The Kontron KTC5520-EATX server board uses the Intel® IOH 36D (I/OAT, VT-d) and Intel® ICH10R chipset that offer significant new enhancements to accelerate I/O traffic and lower CPU utilization in both native and virtualized environments. Memory options features are: 12 DDR3 ECC Registered DIMMs for up to 96GB DDR3 800/1066/1333 MHz. There are three channels of two DIMM sockets per CPU. Software support includes Windows Server 2008 and Red Hat Enterprise Linux version 5.2 or later (64 bits) operating systems.

1.2 What's Included

This board is shipped with the following items:

- One KTC5520/EATX server motherboard
- One rear IO Shield bracket
- Two SATA Cables
- One Documentation & Drivers disk

If any item is missing or damaged, contact the supplier.

1.3 Board Specifications

Table 1-1: Board Specifications

Features	Description
Supported Processors	• Dual Intel® Xeon® Quad Core Processor 5500 Series up to 130W • Integrated DDR3 Memory Controller
Chipset	• Intel® 5520 I/O Hub (IOH36D) and I/O Controller Hub (ICH10R) • Intel QuickPath Interconnect point-to-point links capable of up to 6.4 GT/s • PCI Express 2.0
Ethernet Controller	• Intel® 82576EB Dual 1000BASE-T; supports virtualization
Memory	• 12 (twelve) DIMM sockets; 2 DIMMs per channel / 3 channels per CPU • 96 GB DDR3 Registered ECC SDRAM 8GB RAM per DIMM
BIOS	• BIOS based on AMiBIOS 8
I/O Features	• Two 10/100/1000 Mbps Ethernet (Intel 82576EB) • Six SATA-II ports (Up to 3Gb/s) • One Serial Port • Integrated VGA (BMC) output to the rear panel • HD 7.1 Channel Audio • 4 USB 2.0 ports on Rear Panel I/O
Expansion Features	• 1 PCIe 2.0 x8 using (x16) slot • 3 PCIe 2.0 x8 • 1 PCIe x4 using x8 slot • 1 PCI 32/33 MHz 5V • 2 USB headers (one is flash drive compatible) providing 2 USB ports each • 1 TPM 1.2 header
Keyboard/Mouse	• PS/2 keyboard and mouse Mini DIN connector on the rear panel
Graphic	• Standard DB15 connector • Maximum Display Resolution 1600x1200@60Hz • Aspeed AST2050
Battery	• On board Lithium battery for the CMOS memory/RTC backup
Audio	• Implements Audio input/output sextuplet stack earphone jack on the rear panel. The connections are Line, mic, front, back, side, low-center, SPDIF out/in

Features	Description
Management Features	• IPMI v2.0 • Extensive sensors monitoring and event generation on thresholds • Remote management using web management interface • Built-in KVM/VM over IP (BMC) • IPMI Over LAN/ Serial over LAN (IOL/SOL)
Form Factor	• Server System Infrastructure (SSI) :EEB Form factor
Dimensions	• EATX (Extended ATX) 12 inches (304.8 mm) x 13 inches (330.2 mm)
Environmental	• Designed for FCC A Certification with 6 dB margin
Thermal	• 0 -50 C* with sufficient airflow *Temperature might be higher depending on the chassis. A validation is required.
Humidity	• Designed to meet 5% to 95% non-condensing
Power	Max consumption : • Setting: Intel® Xeon® Processor E5540 (80W), 48GB DDR3 memory, SATA HDD • Total: 310W • Setting: Intel® Xeon® Processor L5518 (60W), 48GB DDR3 memory, SATA HDD • Total: 270W • Setting: Intel® Xeon® Processor W5580 (130W), 48GB DDR3 memory, SATA HDD • Total: 435W Power supply must be compliant to the SSI specification
Software Support	• Windows Server 2008 and Red Hat Enterprise Linux version 5.2 or later (64 bits)
Compliance	• PCIe 2.0 specification • 6 out of 6 to the RoHS/ WEEE European Directives, China RoHS requirements • ACPI rev 2.0 • HPM.1 • IPMI 2.0 • SSI : Enterprise Electronics Bay Specification 2008, Version 1.
Target Certifications	• Designed to meet UL 60950-1 safety certification, EN55022 Class A, ETS-300-019 compliance, EN-300-386, IEC 60950, CSA C22.2/60950 (Canada), EN 60950 (EU), EN 55024 (EU), EMC Directive 89/336/EEC (EU), CE, NEBS Level 3 (designed for), FCC B

1.4 Virtualization Capabilities

- Intel® Virtualization Technology in Intel® Xeon® processors (Intel® VT-x)
- Intel® Virtualization Technology for Directed I/O (Intel® VT-d)
- Intel® Virtualization Technology for Connectivity (Intel® VT-c)

Chapter 2

Board Features

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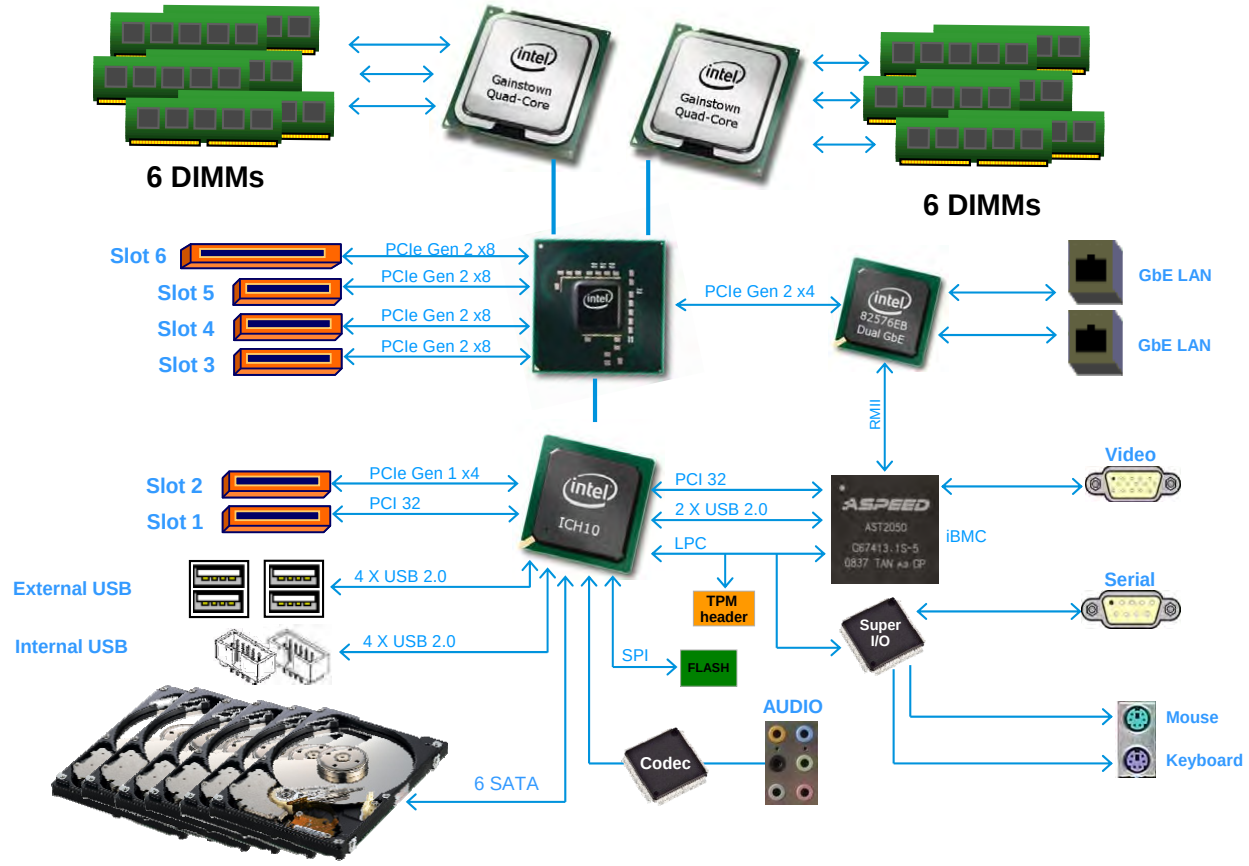
2. Board Features

2.1 Block Diagram

Figure 2-1: Block Diagram



2.2 System Core

2.2.1 Intel 5500 family Processors

- Built on 45 nanometer process technology.
- Quad core processor in 1366-land FCLGA.
- Instruction Cache = 32 KB, per core
- Data Cache = 32 KB, per core
- 256 KB Mid-Level Cache per core
- Up to 8 MB shared among cores (up to 4)
- Streaming SIMD Extension 2, 3 and 4 (SSE2, SSE3 and SSE4)
- Integrated 3-channel DDR3 memory controller
- Intel QuickPath Interconnect point-to-point links capable of up to 6.4 GT/s
- Intel 64 Architecture
- Enhanced Intel SpeedStep Technology
- Intel Virtualization Technology
- Simultaneous Multi-Threading

2.2.2 Intel IOH 36D

- QuickPath interconnect to the CPU
- 36 PCI Express 2.0 lanes (5.0Gb/sec/lane/direction)
- Enterprise South bridge Interface (ESI) x4 lanes for communicating with the Intel ICH10R

2.2.3 ICH10R

- Enterprise South bridge Interface (ESI) x4 lanes for communicating with the Intel IOH36D
- Real Time Clock
- Serial ATA controller
- RAID configuration available

- Advanced Host Controller Interface
- Intel Matrix Storage Technology
- Low Pin Count (LPC) Interface
- Serial Peripheral Interface
- DMA Controller, Timer/Counters, Interrupt Controller
- Universal Serial Bus (USB)
- GPIOs
- Enhanced Power Management
- System Management Bus 2.0 (SMBus)

2.3 USB 2.0 Interfaces

The board embeds a USB controller. This controller is compliant to USB 2.0. It provides four USB ports on the Rear I/O Bracket. Those ports can be used for external storage and for booting

USB features include:

- Capability to daisy chain as many as 127 devices per interface
- Fast bi-directional
- Isochronous/asynchronous interface
- 480 Mbs transfer rate
- Standardization of peripheral interfaces into a single format
- Retro compatible with USB 1.1 devices

USB supports Plug and Play and hot-swapping operations (OS level). These features allows USB devices to be automatically attached, configured and detached, without reboot or running setup.

Table 2-1: USB Rear Panel I/O Connector Pinout

Pin	Signal
1	VCC
2	DATA-
3	DATA+
4	GND

Table 2-2: USB Header Connector Pinout

Pin	Signal	Pin	Signal
1	VCC	2	VCC
3	DATA0-	4	DATA1-
5	DATA0+	6	DATA1+
7	GND	8	GND
9	KEYING	10	N.C.

Signal Path:
- 4 USB 2.0 on Rear Panel I/O
- 2 USB 2.0 headers (2 ports per header) on the motherboard

BIOS Settings:
Advanced --> USB Configuration

2.4 USB Flash Module

The KTC5520/EATX supports Solid State Drive. It is a NAND flash disk module with a USB 2.0 interface. The module is socketed on a 2x5 header attached to the KTC5520/EATX PCB. Here are the main features:

- Many available sizes
- Mean-Time Between Failures (MTBF) of 5 millions hours
- 5 Years Useful Life under specific conditions
- Read throughput of 28MB/second
- Write throughput of 20MB/second
- I/O Operations per second of 100 (4KB random 2 Read + 1 Write)
- 5V operating voltage
- 0 to 70 Celcius operating temperature

Signal Path:
USB Flash Module Connector is located on the right side just below the Mem0 Fan connector.

BIOS Settings:
Advanced --> USB Configuration

2.5 Serial ATA

The KTC5520/EATX features six SATA connectors. The ports are provided from the ICH10R. They are SATA II compatible. The ICH10R SATA host controller supports independent DMA operation and supports data transfer rates of up to 3.0 Gb/s (300 MB/s).

2.5.1 RAID Support

The BIOS Setup Utility provides drive configuration options on the Advanced | Drive Configuration setup page, some of which affect the ability to configure RAID. The On-board SATA Controller option is enabled by default and when enabled, the SATA Mode option can be set to either one of the following three modes:

“IDE” It supports up to six SATA ports with IDE legacy Mode.

“AHCI” It supports all SATA ports using the Advanced Host Controller Interface.

“RAID” In this mode, the Intel Embedded Server RAID Technology II is enabled.It provides RAID modes 0 and 1. At least two disks must be connected to activate this option.

When RAID option is set, a reboot is required to activate the RAID controller

Software Usage:
To access the RAID utility interface, CTRL-I must be hit when prompted at startup.

2.6 Video Interface

The integrated VGA controller is fully compliant with the well-known legacy VGA standard. The maximum graphics display resolution mode the board can support is 1600x1200@60Hz. The video controller is not optimized for 3D rendering.

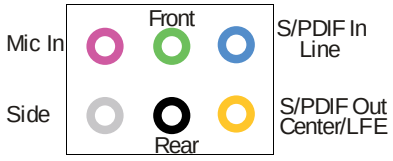
Signal Path:
Video signals are available through the Rear Panel I/O connector.

Note:
When an external video card is installed, the onboar video will be disabled and the remote video from the KVM will also be disabled.

2.7 Audio

High definition audio is available onboard through a Realtek ALC888 high-performance 7.1 Channel High Definition Audio Codec providing eight DAC channels. All analog IO are input and output capable, and headphone amplifiers are also integrated at each analog output. All analog IOs can be re-tasked according to user's definitions, or automatically switched depending on the connected device type. The defaults settings are shown below.

Figure 2-2: Sound Connectors Defaults Settings



Signal Path:
The sound is available through the 6 audio connectors available on the rear bracket.

2.8 PS2 Mouse & Keyboard

Two PS2 connectors are available on the Rear Panel I/O bracket. One is for the keyboard and the other one is for the Mouse.

2.9 Ethernet Interfaces

The KTC5520/EATX has an Intel 82576EB gigabit Ethernet controllers. Two ports are available through the Rear Panel I/O.

The i82576EB features high performance with TCP/IP and UDP/IP checksum offloading for IPv4 and IPv6, packet filtering, and jumbo frame up to 16K. See www.intel.com for additional details on the i82576EB.

The KTC5520/EATX has boot from LAN capability (PXE) on these ports. Enable the option from the BIOS Setup Program. Please refer to Section 5.1, AMI BIOS Set-up Program.

Signal Path:
Two RJ45 connectors are available on the Rear Panel I/O.

BIOS Settings:
Advanced --> Onboard LAN Configuration

2.10 Serial Interfaces

The KTC5520/EATX has one serial port on the Rear Panel I/O for asynchronous serial communications. It is a 16C550 high-speed UART compatible and support 16-byte FIFO buffers for transfer rates from 9,6Kbps to 115,2Kbps.

Table 2-3: Serial Interface Connector Pinout

Pin	Signal
1	DCD
2	RXD#
3	TXD#
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

Signal Path:
The serial port is available through the DB9 connector located on the Rear Panel I/O shield

BIOS Settings:
System Management --> SuperIO Configuration

2.11 PCI & PCI express Slots

One PCI 32bit/33MHz 5V is available on slot 1 and allows the installation of a PCI expansion card. One PCI express Gen1 x4 with a x8 connector is available on slot 2. Three PCI express Gen2 x8 with x8 connectors are avaialable on slot 3, 4 & 5. One PCI express Gen2 x8 with a x16 connetor is available on slot 6.

Note:
If a PCI express x16 expansion card is installed in slot6, it will only work at PCI express x8.

2.12 Real Time Clock & NVRAM

This motherboard has a battery backup.

2.13 Baseboard Management Controller

The Baseboard Management Controller is provided using the Aspeed AST2050. This part provides video display, KVM and VM support.

2.14 TPM (Trusted Platform Module)

The KTC5520/EATX has one TPM 1.2 header on the baseboard. This connector supports a TPM module, which can securely store keys, digital certificates, passwords and data. It also helps to enhance network security, protect digital identies and ensure platform integrity.

Table 2-4: TPM Pinout

Pin	Signal	Pin	Signal
1	LCLK	2	GND
3	LFRAME#	4	
5	LRESET#	6	P5V
7	LAD3	8	LAD2
9	P3V	10	LAD1
11	LAD0	12	GND
13	SCL	14	SDA
15	P3VSB	16	SERIRQ
17	GND	18	CLKRUN#
19	LPCPD#	20	LDRQ0#

Chapter 3

Installing the Board

3.1 Setting Jumpers 15
3.2 Board Installation 16
3.3 Quick Reference Sheet 22
3.4 Battery Backup 23

3. Installing the Board

3.1 Setting Jumpers

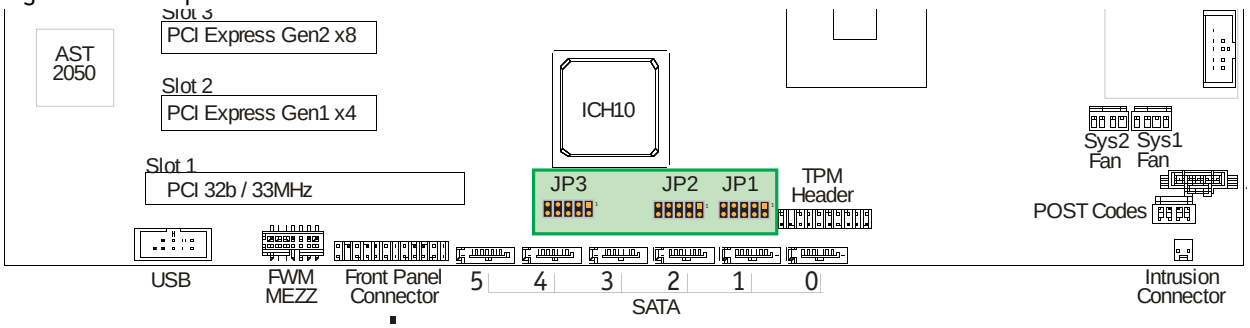
3.1.1 Jumper Description

Table 3-1: Jumper Description

Name	Description	Jumper
Onboard Video	If jumper is present, the video and the KVM video will be disabled	JP 3(7-8)
BMC Disabled	If jumper is present, it disables the BMC Operation	JP2 (1-2)
Clear CMOS Configuration	If jumper is present, it clears the CMOS Configuration	JP2 (9-10)
Firmware Write Protect	If jumper is present, it protects the Firmware	JP1 (7-8)

3.1.2 Setting Jumper & Locations

Figure 3-1: Jumper Locations



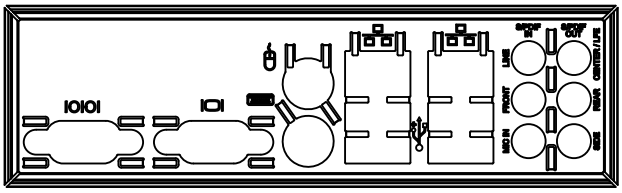
Jumper Settings:
More details about jumper settings can be found in section 3.3.

3.2 Board Installation

3.2.1 Installing the I/O Shield

Install the I/O Shield from the inside of the chassis; audio connectors holes must be close to the PCI slots.

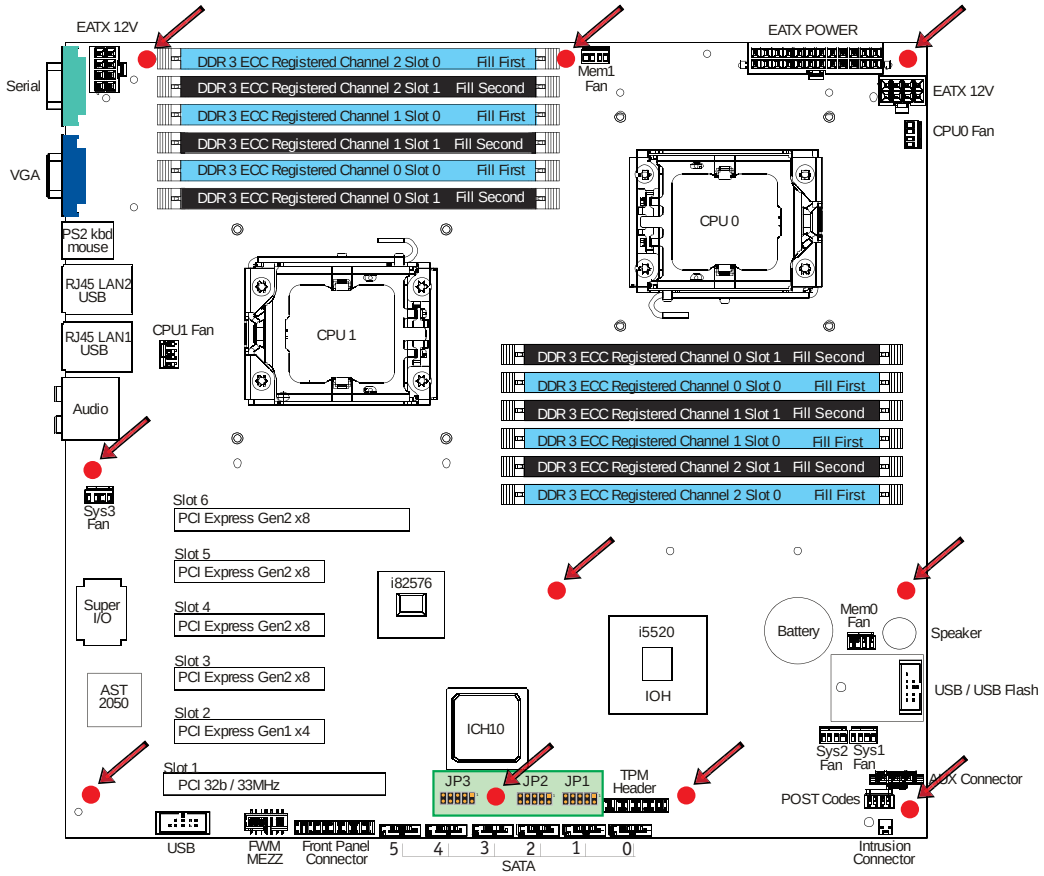
Figure 3-2: Rear Panel I/O Shield



3.2.2 Installing the Motherboard

Make sure all 10 chassis standoffs are properly aligned with the 10 mounting holes shown in red below. Install the 10 fixing screws at their proper location. (screws are provided with your chassis)

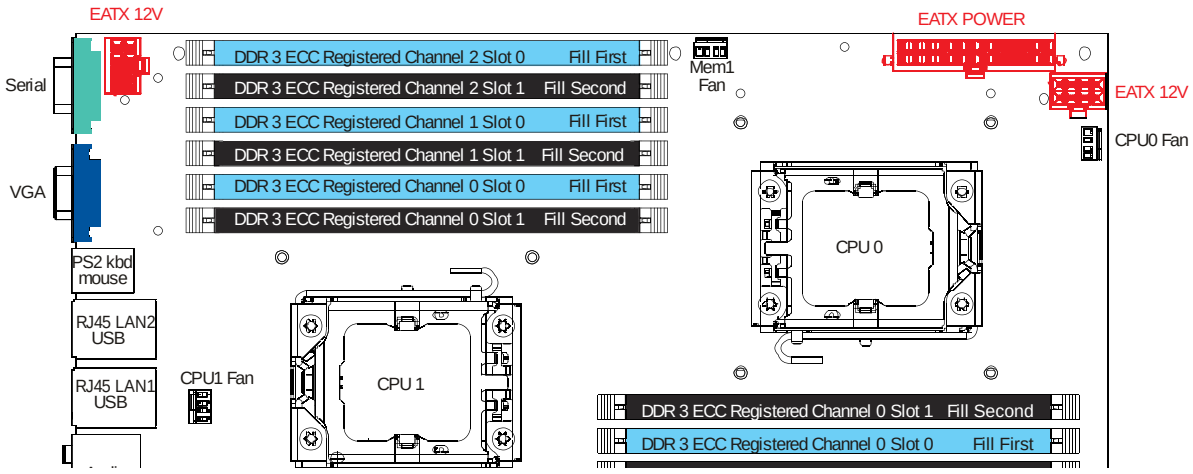
Figure 3-3: Mounting Holes



3.2.3 Connecting the Power Supply

Connect both EATX 12V connectors and the 24-pin main power connector.

Figure 3-4: Connecting the Power


EATX 12V
EATX POWER
Serial
VGA
PS2 kbd mouse
RJ45 LAN2 USB
RJ45 LAN1 USB
CPU1 Fan
CPU 1
DDR 3 ECC Registered Channel 2 Slot 0 Fill First
DDR 3 ECC Registered Channel 2 Slot 1 Fill Second
DDR 3 ECC Registered Channel 1 Slot 0 Fill First
DDR 3 ECC Registered Channel 1 Slot 1 Fill Second
DDR 3 ECC Registered Channel 0 Slot 0 Fill First
DDR 3 ECC Registered Channel 0 Slot 1 Fill Second
Mem1 Fan
CPU 0
DDR 3 ECC Registered Channel 0 Slot 1 Fill Second
DDR 3 ECC Registered Channel 0 Slot 0 Fill First
EATX 12V
CPU0 Fan

WARNING

Heat sinks might have sharp hedges.

Note:

Power supply must be compliant to the SSI specification and it is recommended to use a 1000W power supply.

3.2.4 Memory

The KTC5520/EATX has 6 memory channels, 3 for each CPU. There are 2 DIMMs per memory channels for a total of 12 DDR3 memory sockets. The KTC5520/EATX accepts DDR3, 1.5V typical, registered, ECC, x4 or x8 memory with up to 4 ranks per DIMM. The DDR3 memory channels run at 800MHz, 1066MHz and 1333MHz depending on your CPUs. The maximum DDR3 SDRAM size is 8GBytes per DIMM for a populated 96 gigabytes maximum on the KTC5520/EATX. Memory modules shall have a validated thermal solution (heatsink) and may require a certain class of chassis. It is recommended that modules have thermal sensors for accurate temperature monitoring and to throttle the memory interface in case of overheating. Memory can perform double refresh rate to get higher maximum operating temperature.

The content of the SDRAM is not affected by a warm reset.

A minimum memory size of 1 Gbyte is supported using a single DIMM. A maximum memory size of 96 Gbyte is supported using 8 Gbyte technology DIMM in each slot.

Always populate Slot 0 first on each channel.

Table 3-2: Memory Configuration

DIMM Slots per Channel	DIMM Populated per Channel	POR Speeds	Rank per DIMM (any combination)	Population Rules
2	1	800, 1066, 1333	SR, DR	1. Any combination of x4 and x8 RDIMMs, with 1Gb, or 2Gb DRAM density 2. Populate DIMMs starting with clock 0, furthest from the CPU
2	1	800, 1066	QR	
2	2	800, 1066	SR, DR	
2	2	800	SR, DR, QR	

Kontron recommends to use tested memory with this product. Thermal issues or other problems may arise if you don't use tested modules. At the time of publication of this user guide, the following memories (Table 3-3) were confirmed functional with the product. As the memory market is volatile, this list is subject to change, consult the KTC5520/EATX web page for an up to date list.

3.2.4.1 Memory List and Characteristics:

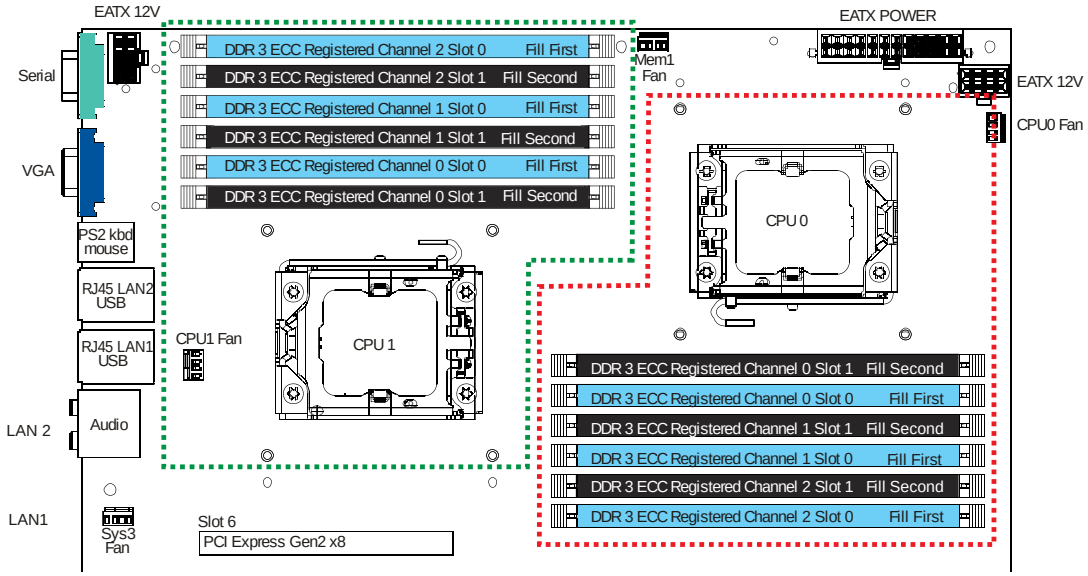
Table 3-3: Tested Memory List

Manufacturer Part Number	Description	Company
VL33B2863E-F8MD	1GB PC3-8500 Registered ECC DIMM - 1 RANK - HEIGHT: 0,72''	Virtium
VL33B5663F-F8M	2GB PC3-8500 REGISTERED ECC DIMM - 2 RANK - HEIGHT: 0,700''	Virtium
VL33B5663E-F8MD	2GB PC3-8500 Registered ECC DIMM - 2 RANK - HEIGHT: 0,72''	Virtium
SG572568FH8P6LC1	2GB PC3-8500 Registered ECC DIMM - 2 RANK - HEIGHT: 0,74''	Smart Modular Technologies
SG572568FH8P6LC	2GB PC3-8500 REGISTERED ECC DIMM - 2 RANK - HEIGHT: 1,18''	Smart Modular Technologies
VL33B5160A-K9S	4GB PC3-10600 REGISTERED ECC DIMM- 2 RANK - HEIGHT: 1,181''	Virtium
VL33B5168F-F8M	4GB PC3-8500 REGISTERED ECC DIMM - 2 RANK - HEIGHT: 0,700''	Virtium
VL33B5160A-F8S	4GB PC3-8500 REGISTERED ECC DIMM - 2 RANK - HEIGHT: 1,181''	Virtium
SG5127RD325693-HB	4GB PC3-10600 REGISTERED ECC DIMM - 2 RANK	Smart Modular Technologies

3.2.4.2 Installing the Memory

It is highly recommended to populate equally the memory for each CPU beginning with channel 0.

Figure 3-5: Memory and CPU association


EATX 12V
Serial
VGA
PS2 kbd mouse
RJ45 LAN2 USB
RJ45 LAN1 USB
Audio
LAN 2
LAN1
Sys3 Fan
CPU1 Fan
DDR 3 ECC Registered Channel 2 Slot 0 Fill First
DDR 3 ECC Registered Channel 2 Slot 1 Fill Second
DDR 3 ECC Registered Channel 1 Slot 0 Fill First
DDR 3 ECC Registered Channel 1 Slot 1 Fill Second
DDR 3 ECC Registered Channel 0 Slot 0 Fill First
DDR 3 ECC Registered Channel 0 Slot 1 Fill Second
CPU 1
Slot 6
PCI Express Gen2 x8
Mem1 Fan
EATX POWER
EATX 12V
CPU0 Fan
CPU 0
DDR 3 ECC Registered Channel 0 Slot 1 Fill Second
DDR 3 ECC Registered Channel 0 Slot 0 Fill First
DDR 3 ECC Registered Channel 1 Slot 1 Fill Second
DDR 3 ECC Registered Channel 1 Slot 0 Fill First
DDR 3 ECC Registered Channel 2 Slot 1 Fill Second
DDR 3 ECC Registered Channel 2 Slot 0 Fill First

WARNING

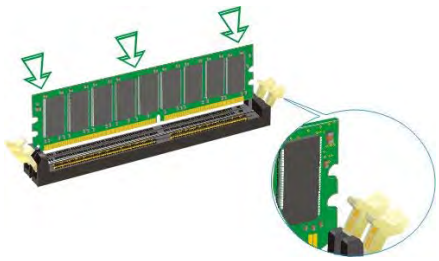
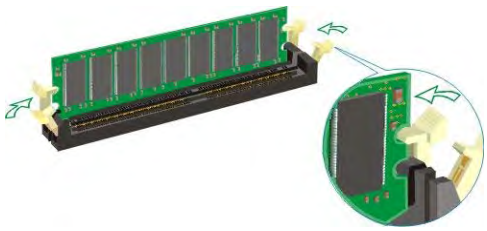
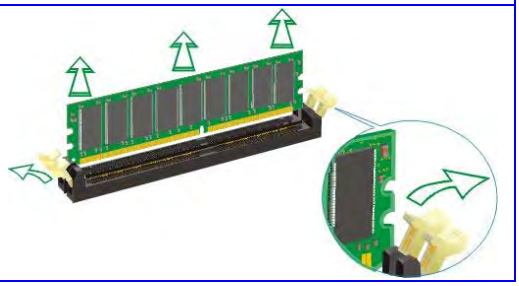
Unplug the power supply before manipulating the dimms

WARNING

Because static electricity can cause damage to electronic devices, take the following precautions:

Wear a grounding wrist strap before removing the board from its package; this will discharge any static electricity that may have built up in your body.

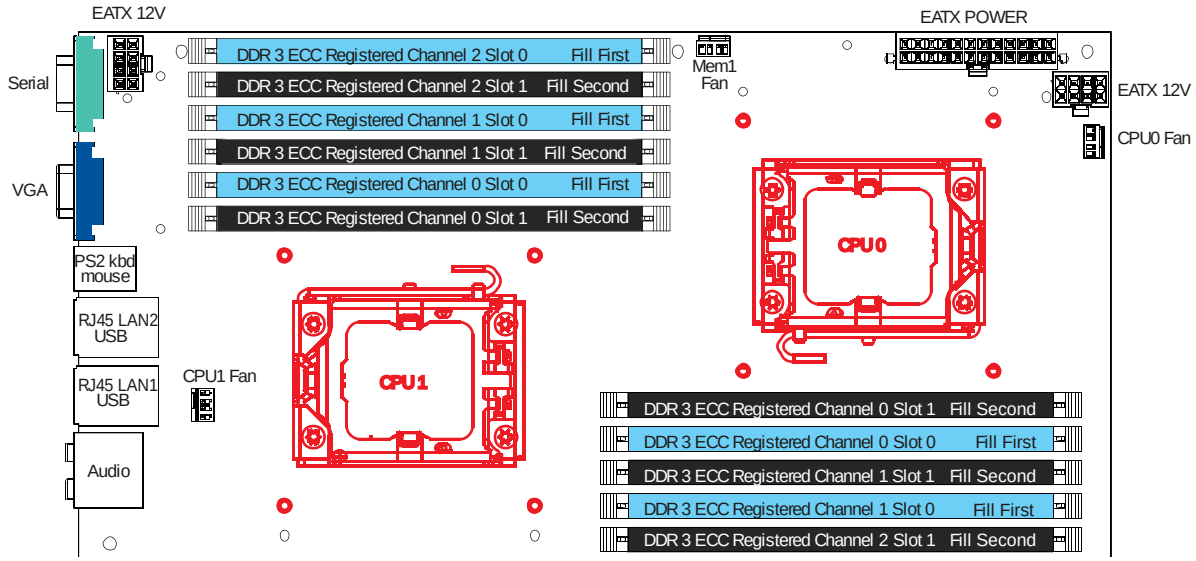
Figure 3-6: Memory Installation

Insert the memory module into a socket, aligning the notches on the module with the socket's key inserts.	
Push down the memory module until the retaining clips lock on each side.	
Repeat these steps to populate the other socket.	
To remove a memory module from a socket, push sideway the retaining clips on each side of the socket, to release the module. Pull out the memory from the socket.	

3.2.5 Processor

All Intel Xeon Quad Core Processors 5500 Series up to 130W are supported.

Figure 3-7: Processors Locations


EATX 12V
EATX POWER
Serial
VGA
PS2 kbd mouse
RJ45 LAN2 USB
RJ45 LAN1 USB
Audio
CPU1 Fan
Mem1 Fan
EATX 12V
CPU0 Fan
CPU0
CPU1
DDR 3 ECC Registered Channel 2 Slot 0 Fill First
DDR 3 ECC Registered Channel 2 Slot 1 Fill Second
DDR 3 ECC Registered Channel 1 Slot 0 Fill First
DDR 3 ECC Registered Channel 1 Slot 1 Fill Second
DDR 3 ECC Registered Channel 0 Slot 0 Fill First
DDR 3 ECC Registered Channel 0 Slot 1 Fill Second
DDR 3 ECC Registered Channel 0 Slot 1 Fill Second
DDR 3 ECC Registered Channel 0 Slot 0 Fill First
DDR 3 ECC Registered Channel 1 Slot 1 Fill Second
DDR 3 ECC Registered Channel 1 Slot 0 Fill First
DDR 3 ECC Registered Channel 2 Slot 1 Fill Second

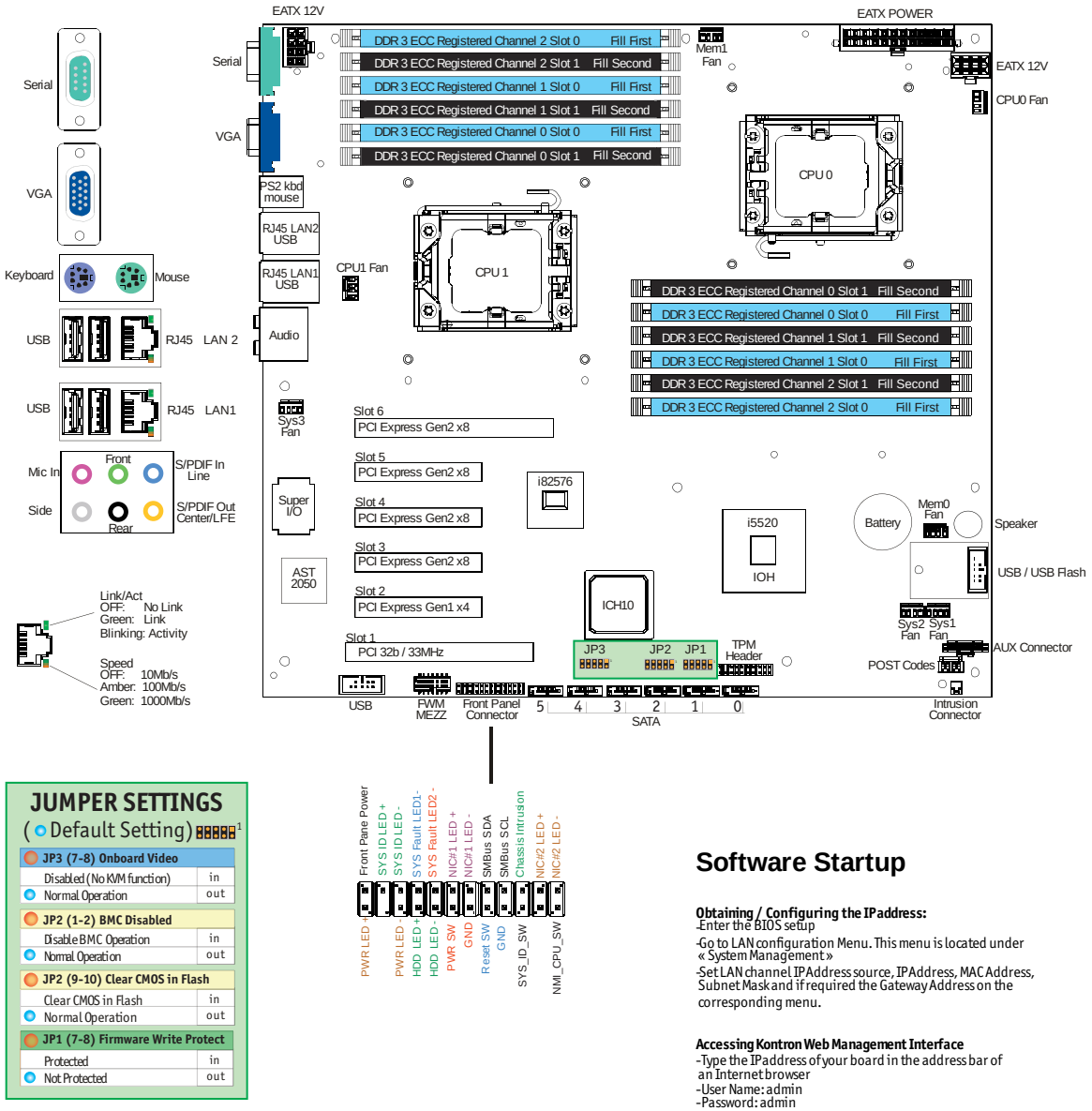
3.2.5.1 Processor Installation

In the case only one processor is installed on the KTC5520/EATX, CPU1 shall be installed to keep the temperature monitoring features of the CPU. Otherwise, if it is installed in the other CPU socket, the processor temperature reading will not be possible and the fan management will raise CPU0 fan speed to maximum. Sensors 08 and 09 values will display “No Reading” and sensors 44 and 45 status will indicate a Configuration Error.

Make sure to follow the instructions provided with the processor and it’s thermal solution when installing it and it’s thermal solution.

3.3 Quick Reference Sheet

Figure 3-8: Quick Reference Sheet



JUMPER SETTINGS

(Default Setting) [1]

JP3 (7-8) Onboard Video	
Disabled (No KVM function)	in
Normal Operation	out
JP2 (1-2) BMC Disabled	
Disable BMC Operation	in
Normal Operation	out
JP2 (9-10) Clear CMOS in Flash	
Clear CMOS in Flash	in
Normal Operation	out
JP1 (7-8) Firmware Write Protect	
Protected	in
Not Protected	out

Software Startup

Obtaining / Configuring the IPaddress:
-Enter the BIOS setup
-Go to LAN configuration Menu. This menu is located under « System Management »
-Set LAN channel IPAddress source, IPAddress, MAC Address, Subnet Mask and if required the Gateway Address on the corresponding menu.

Accessing Kontron Web Management Interface
-Type the IPaddress of your board in the address bar of an Internet browser
-User Name: admin
-Password: admin

Note:

A soft copy can be accessed through the Web Management Interface. The latest version is always available from the Kontron web site at: www.kontron.com

3.4 Battery Backup

An onboard 3V lithium battery is provided to back up BIOS setup values and the real time clock (RTC).

3.4.1 Operation and Preventative Maintenance

The operational battery voltage must be between 2.4 and 3.0 volts.

When the board is stored and is kept in it's original package, the battery must be replaced when the battery voltage is below 2.4 volts.

For preventive operational maintenance, we recommend to verify the battery voltage after 4 years. After that period, we recommend that the safety voltage is checked more often. The normal battery life expectancy depends on the utilisation of the board.

Battery description: CR2032 3V battery

3.4.2 Replacing the Battery

To replace the battery follow the procedure below:

1 Turn off the board and disconnect the AC power cord from the power supply.

2 Remove the battery from the socket with your fingers. Do not use any metal tool.

3 Install a new battery in the socket and observe the correct polarity. (+ must face up)

4 Reconnect the AC power cord and boot the board.

5 Enter the BIOS setup by pressing “F1” to restore the time and date configurations.

WARNING

There is a danger of explosion if you replace the battery incorrectly.

Replace the battery with the same or equivalent type .

Chapter 4

Management

4.1 Connecting to the Web Management Interface 25
4.2 System 25
4.3 Sensor 26
4.4 Control 26
4.5 Console 27
4.6 Maintenance 28
4.7 Logout 30

4. Management

4.1 Connecting to the Web Management Interface

Before connecting to the Management Interface, the Management IP address needs to be confirmed. To obtain the address or configure it:

- Enter the BIOS Setup.
- Go to LAN configuration menu, which is located under “System Management”.
- Set LAN channel IP Address source, IP Address, MAC address, Subnet Mask and if required, the Gateway address on the corresponding menu.
- To enable the settings, select “Enable Channel”.

To access to the Web Management Interface:

- Open any web browser.
- Type the address of the management controller in the browser address bar.
- The default user name and password are admin/admin.

Note:
A maximum of 5 users can be connected simultaneously.
An automatic logout will be done after 300 seconds of inactivity.

4.2 System

4.2.1 Information

Once connected to the Web Management Interface, the first page seen is the System Information. All board information are displayed on this page.

4.2.2 Event Log

On the left column, the Event Log section can be selected by clicking on the corresponding text. In this section the System Event Log (SEL) Information and the Event list are shown. A maximum of 1023 events can be displayed; the older ones will be removed when there are more than 1023. Using the arrows at the bottom of the displaying table can browse events. They can be cleared or refreshed manually.

4.3 Sensor

4.3.1 Reading

This web management section displays all the board sensors readings. The values can be refreshed manually, if required.

4.4 Control

4.4.1 Remote Power/Reset

This section allows to power down, shutdown, reset and power cycle the board.

Table 4-1: Payload impact

Command	Payload impact
Power Down Now	A power down will turn OFF the payload like if the Power button was pushed for 4 seconds.
Graceful Shutdown	A graceful shutdown will power off the payload in a controlled way. It will initiate a proper OS shutdown.
Reset	A reset will immediately reboot the payload like if the Reset button was pushed.
Power Cycle	A power cycle will power down and then start the payload.

Current POST value is displayed in this page.

4.4.2 Fans

This section allows viewing and controlling the fans speed. Two modes are available to control the fans "Switch to Manual Speed Control" or "Switch to Auto Temp Control". Click the corresponding button to switch them. Only the manual mode can be used to modify the memory fan controls.

By default, automatic mode is selected. Targeted temperature, high and low tolerance and maximum and minimum fan speed need to be set. Fan speed range is from 0 to 63.

The second one is the manual mode and only target speed setting can be adjusted. The lowest value is 0 and maximum speed is 63.

To activate the new configuration, the button "Set New Speed" must be click.

4.5 Console

4.5.1 KVM/VM

This section gives access to the KVM and the VM.

4.5.1.1 KVM

To start the KVM, click on the button called “KVM (Keyboard Video Mouse)”. A small Java file will be downloaded on the local computer. A safety warning might pop-up and asks if the application can be started. Answer "yes" to continue. Then a new window will appear and display what is shown on the computer(KTC5520/EATX).

The motherboard can be managed from any remote computer. Only the IP address is required to access it.

The mouse needs to be configured depending on the installed operating system. To do so, when the KVM is started, click on Tools, located on the menu bar, then on Mouse and select the appropriate OS in the Mouse Acceleration section; then click on OK.

4.5.1.2 VM

To start the VM, click on the button called “Virtual Media”. A small Java file will be downloaded on the local computer. A safety warning might pop-up and asks if the application can be started. Answer "yes" to continue. Then a new window will appear in which there will be all physical drives which are on the local computer. Drive image can be added by clicking on "Add image" button. In this menu, select an ISO or IMG file to be mounted. To map a drive, check the corresponding box in the window. The device will be detected as a USB device. An operating system installation can be done remotely by mapping the source file.

4.6 Maintenance

4.6.1 Documentation

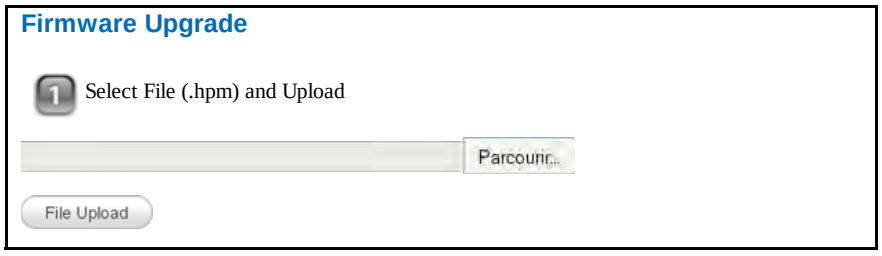
This section allows accessing the "Quick Reference Sheet" without being connected on internet. It also provides a web link to access the manual and all the drivers required for this board. An internet connection is required to download the latest files.

4.6.2 Firmware Upgrade

This section gives the possibility to upgrade the firmware of the Web Management Interface.

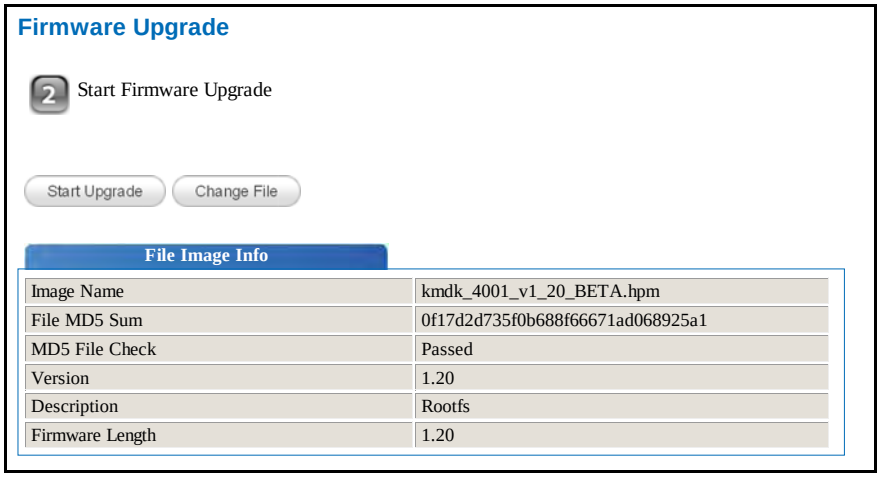
1 To proceed, simply click “browse...” and select the “.hpm” file to upload. Then click on “File Upload”.

Figure 4-1: Firmware Upgrade Step 1



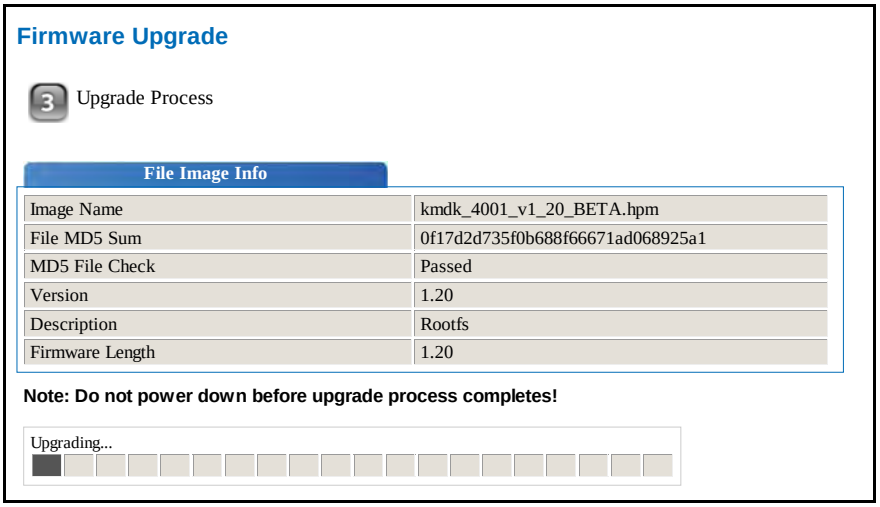
2 When the file is uploaded, the file information will be displayed.

Figure 4-2: Firmware Upgrade Step 2



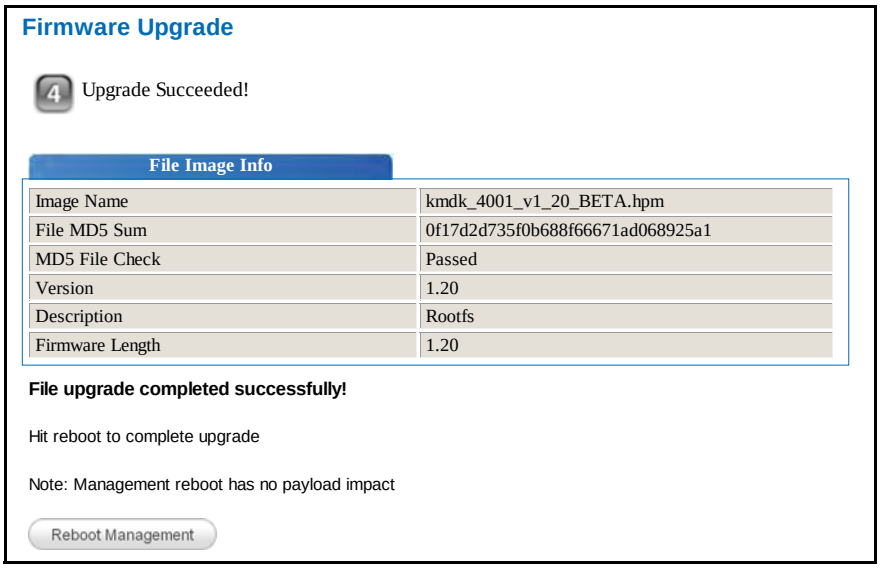
3 Start the firmware upgrade by clicking “Start Upgrade”. A progress bar will display the upgrade status.

Figure 4-3: Firmware Upgrade Step 3



4 If the upgrade is successful, the "Reboot Management" button will appear. Click it to restart the management interface. An automatic page reload will be done after 30 seconds. This reboot has no payload impact. If the upgrade fails, please contact your Kontron Technical Support to obtain a procedure to manually upgrade or restore your firmware.

Figure 4-4: Firmware Upgrade Step 4



4.6.3 Users

This section allows managing the authorized users. A maximum of five (5) users can be set. All users can be enabled or disabled. Privilege levels are defined in the table below.

Table 4-2: Privilege Level Description

Privilege Levels	Description
Administrator	All BMC commands are allowed, including configuration settings. An Administrator can even execute configuration commands that would disable the channel that the Administrator is working on.
Operator	All BMC commands are allowed, except for configuration settings which can change the behavior of the out-of-band interfaces. For example, Operator privilege does not allow the capability to disable individual channels, or change user access privileges.
User	Only "basic" commands are allowed. These are primarily commands that read data and retrieve status. Commands that can be used to alter BMC configuration, write data to the management controllers, or perform system actions such as resets, power on/off, and watchdog activation are locked.
Callback	This may be considered the lowest privilege level. Only commands necessary to support initiating a callback are allowed.
No Access	No access is given to this user.

The User ID 1 is a user without name and password. This user can be enabled or disabled and has a privilege level set to "User" by default.

The User ID2 is the admin user. It has the "Administrator" privileges.

The User ID3 to User ID5 are configurable. By default they are not set to "Enable".

4.7 Logout

This button allows a safe logout of the management interface.

An automatic logout will be done after 300 seconds of inactivity.

Chapter 5

Software Setup

5.1 AMI BIOS Setup Program 32
5.2 Boot Utilities 85
5.3 Console Redirection (VT100 Mode) 86

5. Software Setup

5.1 AMI BIOS Setup Program

All relevant information for operating the board and connected peripherals are stored in the CMOS memory backed-up by a battery or in the main BIOS flash and EEPROM. The latest is the default configuration.

5.1.1 Accessing the BIOS Setup Utility

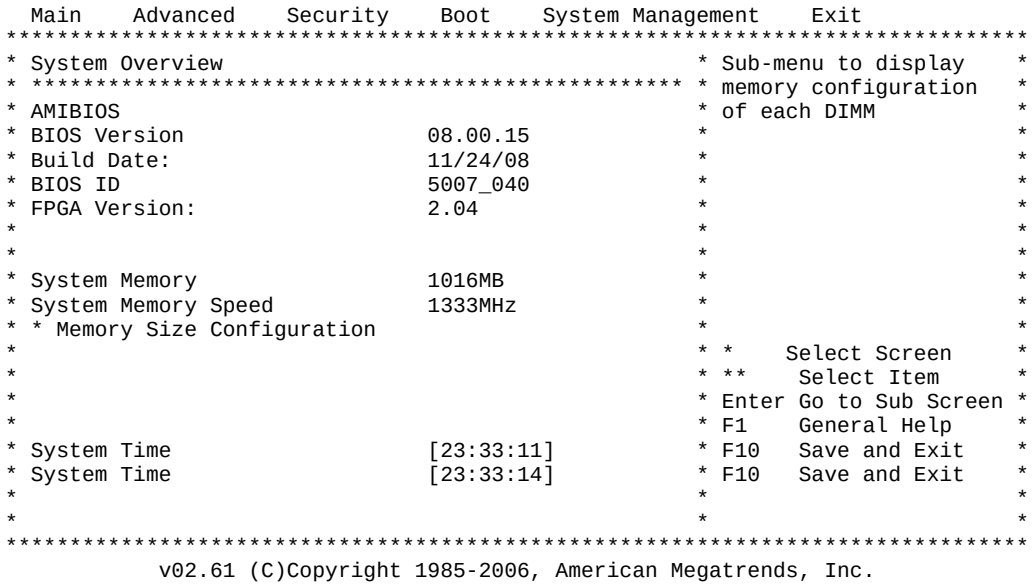
The system BIOS (Basic Input Output System) provides an interface between the operating system and the hardware of the KTC5520/EATX board. It uses the AMI Setup program, a setup utility in flash memory that is accessed by pressing the <DEL> (or <F4> from a console redirection terminal) key at the appropriate time during system boot. This utility is used to set configuration data in CMOS RAM.

To run the AMI Setup program incorporated in the ROM BIOS:

- Turn on or reboot the system.
- When you get the following messages, hit <DEL> key to enter SETUP.

```
AMIBIOS(C)2006 American Megatrends, Inc.
KONTRON KTC5520/EATX BIOS Version 1.28

(C) American Megatrends, Inc.
64-3047-009999-00101111-112408-TYLSBURG-5007_041-Y2KC
CPU : Intel(R) Xeon(R) CPU           E5540  @ 2.53GHz
 Speed : 2.53 GHz


Reset Type: Cold Reset
BIOS Upgrade externally
Currently Running On Primary BIOS.

Press DEL to run Setup (F4 on Remote Keyboard)
Press F12 if you want to boot from the network
Press F11 for BBS POPUP (F3 on Remote Keyboard)
Initializing USB Controllers .. Done.

Memory Channel 0 DIMM 0 Size 1024MB
Memory Channel 0 DIMM 1 Size Not Installed
Memory Channel 1 DIMM 0 Size Not Installed
Memory Channel 1 DIMM 1 Size Not Installed
Memory Channel 2 DIMM 0 Size Not Installed
Memory Channel 2 DIMM 1 Size Not Installed
DDR3: 1016MB OK, Speed: 1333MHz

USB Device(s): 1 Keyboard, 1 Storage Device

Auto-detecting USB Mass Storage Devices ..
Device #01 : Corsair Flash Voyager  *HiSpeed*
01 USB mass storage devices found and configured.

Initializing Intel(R) Boot Agent GE v1.3.24
PXE 2.1 Build 086 (WfM 2.0)

Initializing Intel(R) Boot Agent GE v1.3.24
PXE 2.1 Build 086 (WfM 2.0)
```

The main menu of the AMI BIOS CMOS Setup Utility appears on the screen.



Setup Default values provide optimum performance settings for all devices and system features.

Note:
The CMOS setup options described in this section are based on BIOS Version1.28. The options and default settings may change in a new BIOS release. To obtain the latest release, consult the Kontron web site.

CAUTION
These parameters have been provided to give control over the system. However, the values for these options should be changed only if the user has a full understanding of the timing relationships involved.

Note:
All options in Bold are the default settings.

5.1.2 Menu Bar

The Menu Bar at the top of the window lists these selections:

Menu Selection	Description
Main	Use this menu for basic system configuration.
Advanced	Use this menu to set the Advanced Features available on your system.
Security	Use this menu to configure Security features.
Boot	Use this menu to determine the booting device order.
System Management	Use this menu to set and view the System Management on your system.
Exit	Use this menu to choose Exits option.

Use the left and right arrows keys to make a selection.

5.1.2.1 Legend Bar

Use the keys listed in the legend bar on the bottom to make your selections or exit the current menu. The chart on the following page describes the legend keys and their alternates.

Key	Function
<F1>	General Help windows (see 4.1.2.2).
<Esc>	Exit this menu.
--> arrow keys	Select a different menu.
<Home> or <End>	Move cursor to top or bottom of window.
<PgUp> or <PgDn>	Move cursor to top or bottom of window.
<->	Select the Previous Value for the field.
<+>	Select the Next Value for the field.
<F2> and <F3>	Change colors used in Setup.
<F7>	Discard the changes for all menus.
<F9>	Load the Optimal Default Configuration values for all menus.
<F10>	Save and exit.
<Enter>	Execute Command, display possible value for this field or Select the sub-menu.

To select an item, use the arrow keys to move the cursor to the field you want. Then use the plus-and-minus value keys to select a value for that field. To save value commands in the Exit Menu, save the values displayed in all menus.

To display a submenu, use the arrow keys to move the cursor to the submenu you want. Then press <Enter>.

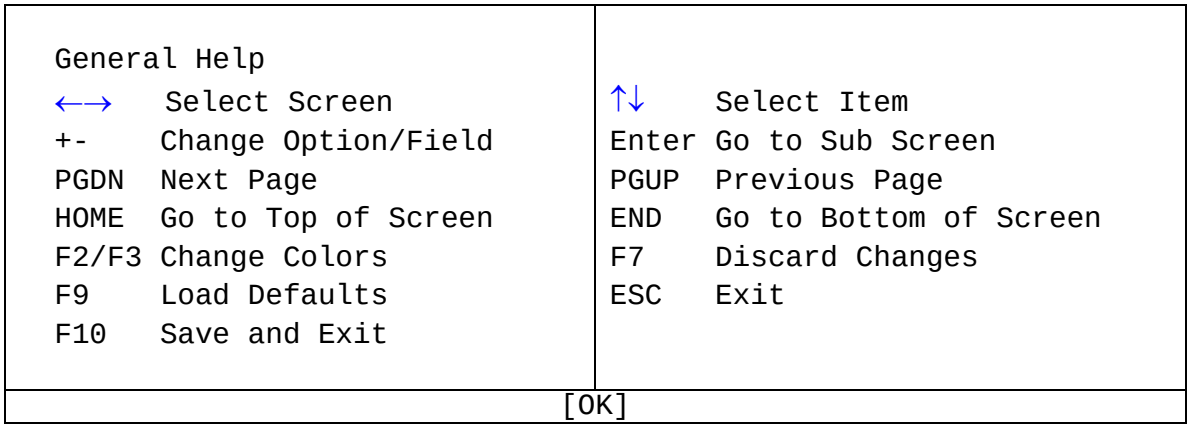
5.1.2.2 Field Help Window

The help window on the right side of each menu displays the help text for the selected field.

It updates as you move the cursor to each field.

5.1.2.3 General Help Windows

Pressing <F1>on any menu brings up the General Help window that describes the legend keys and their alternates:



5.1.3 Main menu

Feature	Options	Description	Setup Help
Version	X.YY	Displays the BIOS core version.	N/A, display only.
Build Date	YYMMDD	Displays the BIOS build date in the format YYMMDD.	N/A, display only.
ID	BIOS ID code	Displays the BIOS identification code. The first 5 characters uniquely identify the board. The last 3 digits correspond to BIOS version in the format X.YZ.	N/A, display only.
	CPU Brand string	Reads and display the 48 bytes CPU Brand string from the CPU MSR.	N/A, display only.
Speed	X Ghz	Displays the current processor core(s) speed.	N/A, display only.
Count	x	Displays the number of physical processors.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
System Time	HH:MM:SS	Set the system time.	Use [ENTER], [TAB] or [SHIFT-TAB] to select a field. Use [+] or [-] to configure system Time.
System Date	MM/DD/YYYY	Set the system date.	Use [ENTER], [TAB] or [SHIFT-TAB] to select a field. Use [+] or [-] to configure system Date.

5.1.4 Advanced menu

Feature	Options	Description	Setup Help
CPU Configuration	N/A	Press Enter to go to sub screen "CPU Configuration".	Configure CPU.
Drive Configuration	N/A	Press Enter to go to sub screen "Drive Configuration".	Configure Drive device(s).
SuperIO Configuration	N/A	Press Enter to go to sub screen "SuperIO Configuration".	Configure SuperIO Chipset Win627DHG.
USB Configuration	N/A	Press Enter to go to sub screen "USB Configuration".	Configure the USB support.
Onboard LAN Configuration	N/A	Press Enter to go to sub screen "Onboard LAN Configuration".	Configure the LAN Devices.
ACPI Configuration	N/A	Press Enter to go to sub screen "ACPI Configuration".	Section for Advanced ACPI Configuration.
Remote Access Configuration	N/A	Press Enter to go to sub screen "Remote Access Configuration".	Configure Remote Access.
Chipset Configuration	N/A	Press Enter to go to sub screen "Chipset Configuration".	
Virtualization Configuration	N/A	Press Enter to go to sub screen "Virtualization Configuration".	Advanced Virtualization Settings
Trusted Computing	N/A	Press Enter to go to sub screen "Trusted Computing".	Configure settings related to Trusted Computing innovations
Watchdog Configuration	N/A	Press Enter to go to sub screen "Watchdog Configuration".	Watchdog Configuration
Event Log Configuration	N/A	Press Enter to go to sub screen "Event Log Configuration".	Mark as read, Clear or View Event Log statistics.
Expansion Slots Configuration	N/A	Press Enter to go to sub screen "Expansion Slots Configuration".	Expansion Slots Option ROM Configuration

5.1.4.1 CPU Configuration sub-menu

Feature	Options	Description	Setup Help
Manufacturer	Intel	Displays the processor manufacturer name.	N/A, display only.
	CPU Brand string	Reads and display the 48 bytes CPU Brand string from the CPU MSR.	N/A, display only.
Frequency	X Ghz	Displays the current processor core(s) speed.	N/A, display only.
BCLK Speed	x MHz	Displays the surrent BCLK speed	N/A, display only.
Cache L1	X KB	Displays amount of Level 1 processor cache per processor.	N/A, display only.
Cache L2	X KB/MB	Displays amount of Level 2 processor cache per processor.	N/A, display only.
Cache L3	X KB/MB	Displays amount of Level 3 processor cache per processor.	N/A, display only.
Ratio Status	Unlocked Locked	Lock status of the FSB multiplier.	Sets the ratio between CPU Core Clock and the FSB Frequency.
Ratio Actual Value	x	Displays current processor FSB multiplier value (FSB time ratio = processor core speed).	N/A, display only.
Processor Power Management Configuration	N/A	Press Enter to go to sub screen "Processor Power Management Configuration".	Configure CPU EIST and C-state function.
Ratio CMOS Setting	x	Selects the processor FSB ratio value (FSB x ratio = processor core speed).	Sets the ratio between CPU Core Clock and the FSB Frequency.
Hardware Prefetcher	Disabled **Enabled**	The hardware prefetcher looks at streams of data. The hardware prefetcher assumes that if a line A and A+1 were requested, then line A+2 also will be requested. The data is prefetched into L2 from external memory. Disabling of the hardware prefetcher may impact processor performance. Default should be enabled. Optionally for DP/MP servers, the default may be set based on performance results observed during platform validation and testing with standard workloads.	For UP platforms, leave it enabled. For DP/MP servers, it may use to tune performance to the specific application.
Adjacent Cache Line Prefetch	Disabled **Enabled**	When enabled the Adjacent Cache Line Prefetcher fetches both cache lines that comprise a cache line pair (128 bytes) when it determines required data is not currently in its cache. When the Adjacent Cache Line Prefetcher is disabled, the processor will only fetch the cache line (64 bytes) that contains the data currently required by the processor. Note: Single processor platforms should enable it. It is recommended that server platforms disable it. Optionally for DP/MP servers, the default may be set based on performance results observed during platform validation and testing with standard workloads.	For UP platforms, leave it enabled. For DP/MP servers, it may use to tune performance to the specific application.

Feature	Options	Description	Setup Help
MPS and ACPI MADT ordering	**Modern ordering** Legacy odering	MPS and ACPI MADT ordering. Modren ordering for Windows XP or later OSes. Legacy ordering for Windows 2000 or earlier OSes.	MPS and ACPI MADT ordering. Modern ordering for Windows XP or later OSes. Legacy ordering for Windows 2000 or earlier OSes.
Max CPUID Value Limit	**Disabled** Enabled		Disabled for WindowsXP
Intel(R) Virtualization Tech	Disabled **Enabled**	This enable the hardware virtualization capability provided by Intel(R) Virtualization Note: A full reset is required to change the setting.	When enabled, a VMM can utilize the additional HW Caps. provided by Intel(R) Virtualization Tech. Note: A full reset is required to change the setting.
Execute-Disable Bit Capability	Disabled **Enabled**	Execute Disable Bit allows the processor to classify areas in memory by where application code can execute and where it cannot preventing certain classes of malicious buffer overflow attacks when combined with a supporting operating system.	When disabled, force the XD feature flag to always return 0.
Intel(R) HT Technology	**Enabled** Disabled	Delivers thread-level parallelism on each processor resulting in more efficient use of processor resources-higher processing throughput-and improved performance on the multi-threaded software of today and tomorrow.	When 'Disabled' only one thread per enabled core is enabled.
Active Processor Cores	**All** 1 2	Number of cores to enable in each physical processor package.	Number of cores to enable in each processor package.
A20M	**Disabled** Enabled	Legacy OSes and APs may need A20M enabled.	Legacy OSes and APs may need A20M enabled.

5.1.4.1.1 Processor Power Management Configuration sub-menu

Feature	Options	Description	Setup Help
Intel(R) SpeedStep(tm) tech	Disabled **Enabled**	Enables Intel(R) SpeedStep(tm) technology for usage by OS.	Disable: Disable GV3 Enable: Enable GV3
Intel(R) TurboMode tech	**Disabled** Enabled	This is an Intel Core i7-specific BIOS feature. When this feature is enabled, the Intel Core i7 processor can dynamically overclock one or two of its four processing cores to improve performance with applications that are not multi-threaded or optimized for quad-core processors (e.g.single-threaded applications).	Turbo mode allows processor cores to run faster than marked frequency in speific condition
Intel(R) C-STATE tech	Enabled Disabled	Advanced power management state (C-state) that significantly reduces the power of the processor during idle periods.	CState: CPU idle is set to C2/C3/C4
C State package limit setting	Auto C1 C3 C6 C7	Advanced power management state (C-state) that significantly reduces the power of the processor during idle periods.	Selected option will programe into C State package limit register
C3 State	Disabled ACPI C2 ACPI C3	Advanced power management state (C-state) that significantly reduces the power of the processor during idle periods.	Nehalem C state action select
C6 State	Enabled Disabled	Advanced power management state (C-state) that significantly reduces the power of the processor during idle periods.	Nehalem C state action select
C1 Auto Demotion	Enabled Disabled	Advanced power management state (C-state) that significantly reduces the power of the processor during idle periods.	When enable, CPU will conditionally demote C3/C6/C7 requests to C1 based on uncore auto-demote information.
C3 Auto Demotion	Enabled Disabled	Advanced power management state (C-state) that significantly reduces the power of the processor during idle periods.	When enable, CPU will conditionally demote C6/C7 requests to C3 based on uncore auto-demote information.

5.1.4.2 Drive Configuration sub-menu

Feature	Options	Description	Setup Help
SATA#1 Configuration	Disabled **Compatible** Enhanced	Compatible mode is for IDE mode. Enhanced mode is to control AHCI or RAID modes.	
Configure SATA#1 as	**IDE** RAID AHCI	When SATA #1 is in enhanced mode, the AHCI or RAID modes can be set.	AHCI: allows advanced SATA features such as Native Command Queuing and hot plug. IDE is legacy disk usage. Note: Any changes need a restart to apply in setup.
SATA#2 Configuration	Disabled **Enhanced**	Enhanced mode is to control AHCI or RAID modes.	
AHCI Configuration	N/A	Press Enter to go to sub screen "AHCI Configuration".	Section for AHCI Configuration.
IDE Configuration	N/A	Press Enter to go to sub screen "IDE Configuration".	Configure the IDE device(s).

5.1.4.2.1 AHCI Configuration sub-menu

Feature	Options	Description	Setup Help
AHCI BIOS Support	**Enabled** Disabled	Support AHCI mode during BIOS control.	Enables for supporting AHCI controller operates in AHCI mode during BIOS control otherwise operates in IDE mode.
AHCI Port0	N/A	Press Enter to go to sub screen "AHCI Port0".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
AHCI Port1	N/A	Press Enter to go to sub screen "AHCI Port1".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.

Feature	Options	Description	Setup Help
AHCI Port2	N/A	Press Enter to go to sub screen "AHCI Port2".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
AHCI Port3	N/A	Press Enter to go to sub screen "AHCI Port3".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
AHCI Port4	N/A	Press Enter to go to sub screen "AHCI Port4".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
AHCI Port5	N/A	Press Enter to go to sub screen "AHCI Port5".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.

5.1.4.2.1.1 AHCI Port0 sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays device size.	N/A, display only.
SATA Port0	**Auto** Not Installed		Select the type of device connected to the system.
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.

5.1.4.2.1.2 AHCI Port1 sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
SATA Port1	**Auto** Not Installed		Select the type of device connected to the system.
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.

5.1.4.2.1.3 AHCI Port2 sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
SATA Port2	**Auto** Not Installed		Select the type of device connected to the system.
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.

5.1.4.2.1.4 AHCI Port3 sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
SATA Port3	**Auto** Not Installed		Select the type of device connected to the system.
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.

5.1.4.2.1.5 AHCI Port4 sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays memory size.	N/A, display only.
SATA Port4	**Auto** Not Installed		Select the type of device connected to the system.
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.

5.1.4.2.1.6 AHCI Port5 sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays memory size.	N/A, display only.
SATA Port5	**Auto** Not Installed		Select the type of device connected to the system.
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.

5.1.4.2.2 IDE Configuration sub-menu

Feature	Options	Description	Setup Help
Primary IDE Master	N/A	Press Enter to go to sub screen "Primary IDE Master".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
Primary IDE Slave	N/A	Press Enter to go to sub screen "Primary IDE Slave".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
Secondary IDE Master	N/A	Press Enter to go to sub screen "Secondary IDE Master".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
Secondary IDE Slave	N/A	Press Enter to go to sub screen "Secondary IDE Slave".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
Third IDE Master	N/A	Press Enter to go to sub screen "Third IDE Master".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
Third IDE Slave	N/A	Press Enter to go to sub screen "Third IDE Slave".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
Fourth IDE Master	N/A	Press Enter to go to sub screen "Fourth IDE Master".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
Fourth IDE Slave	N/A	Press Enter to go to sub screen "Fourth IDE Slave".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.

Feature	Options	Description	Setup Help
Fifth IDE Master	N/A	Press Enter to go to sub screen "Fifth IDE Master".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
Fifth IDE Slave	N/A	Press Enter to go to sub screen "Fifth IDE Slave".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
Sixth IDE Master	N/A	Press Enter to go to sub screen "Sixth IDE Master".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
Sixth IDE Slave	N/A	Press Enter to go to sub screen "Sixth IDE Slave".	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
Hard Disk Write Protect	**Disabled** Enabled	Disable/Enable device write protection. This will be effective only if device is accessed through BIOS.	Disable/Enable device write protection. This will be effective only if device is accessed through BIOS.
IDE Detect Time Out (Sec)	0 5 10 15 20 25 30 **35**	Select the maximum time out value for detecting ATA/ATAPI device(s).	Select the time out value for detecting ATA/ATAPI device(s).

5.1.4.2.2.1 Primary IDE Master sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.

Feature	Options	Description	Setup Help
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.
Type	Not Installed **Auto** CDROM ARMD	This option sets the type of device that the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) has completed.	Select the type of device connected to the system.
Cylinder		Display device geometry.	N/A, display only.
Head		Display device geometry.	N/A, display only.
Sector		Display device geometry.	N/A, display only.
Size		Display device Size.	N/A, display only.
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.

Feature	Options	Description	Setup Help
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.2.2.2 Primary IDE Slave sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.

Feature	Options	Description	Setup Help
Type	Not Installed **Auto** CDROM ARMD	This option sets the type of device that the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) has completed.	Select the type of device connected to the system.
Cylinder		Display device geometry.	N/A, display only.
Head		Display device geometry.	N/A, display only.
Sector		Display device geometry.	N/A, display only.
Size		Display device Size.	N/A, display only.
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.

Feature	Options	Description	Setup Help
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.2.2.3 Secondary IDE Master sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.

Feature	Options	Description	Setup Help
Type	Not Installed **Auto** CDROM ARMD	This option sets the type of device that the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) has completed.	Select the type of device connected to the system.
Cylinder		Display device geometry.	N/A, display only.
Head		Display device geometry.	N/A, display only.
Sector		Display device geometry.	N/A, display only.
Size		Display device Size.	N/A, display only.
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.

Feature	Options	Description	Setup Help
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.2.2.4 Secondary IDE Slave sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.

Feature	Options	Description	Setup Help
Type	Not Installed **Auto** CDROM ARMD	This option sets the type of device that the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) has completed.	Select the type of device connected to the system.
Cylinder		Display device geometry.	N/A, display only.
Head		Display device geometry.	N/A, display only.
Sector		Display device geometry.	N/A, display only.
Size		Display device Size.	N/A, display only.
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.

Feature	Options	Description	Setup Help
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.2.2.5 Third IDE Master sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.

Feature	Options	Description	Setup Help
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.2.2.6 Third IDE Slave sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.

Feature	Options	Description	Setup Help
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.2.2.7 Fourth IDE Master sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.

Feature	Options	Description	Setup Help
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.2.2.8 Fourth IDE Slave sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.

Feature	Options	Description	Setup Help
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.2.2.9 Fifth IDE Master sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.

Feature	Options	Description	Setup Help
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.2.2.10 Fifth IDE Slave sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.

Feature	Options	Description	Setup Help
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.2.2.11 Sixth IDE Master sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.

Feature	Options	Description	Setup Help
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.2.2.12 Sixth IDE Slave sub-menu

Feature	Options	Description	Setup Help
Device	Device type	Displays the type of device (Hard Disk, CD-ROM or ARMD).	N/A, display only.
Vendor	Disk vendor and description	Displays the device vendor name and/or model.	N/A, display only.
Size	X KB/MB/GB	Displays system memory size.	N/A, display only.
LBA Mode	Supported Not Supported	Displays if LBA mode is supported or not by the device.	N/A, display only.
Block Mode	x Sectors	Displays the Block mode size used by the device.	N/A, display only.
PIO Mode	0-4	Displays the PIO mode used by the devices.	N/A, display only.
Async DMA	SingleWord or MutiWord DMA-x	Displays the highest Asynchronous DMA mode supported by the device.	N/A, display only.
Ultra DMA	x	Displays the highest Synchronous DMA mode supported by the device.	N/A, display only.
S.M.A.R.T.	Supported or Not Supported	Displays if S.M.A.R.T. is supported or not by the device.	N/A, display only.
LBA/Large Mode	Disabled **Auto**	LBA (Logical Block Addressing) is a method of addressing data on a disk drive.	Disabled: Disables LBA Mode. Auto: Enables LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled.
Block (Multi-Sector Transfer) Mode	Disabled **Auto**	This option sets the block mode multi sector transfers option.	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0-4	Selects the PIO mode.	Select PIO Mode.

Feature	Options	Description	Setup Help
DMA Mode	**Auto** SWDMA0 SWDMA1 SWDMA2 MWDMA0 MWDMA1 MWDMA2 UDMA0 UDMA1 UDMA2 UDMA3 UDMA4 UDMA5 UDMA6	Selects the DMA mode to access the device. Single Word DMA [0-2] mode. Multi Word DMA [0-2] mode. Ultra DMA [0-6] mode.	Select DMA Mode. Auto : Auto detected SWDMAn: SingleWordDMAn MWDMAn: MultiWordDMAn UDMAn : UltraDMAn
S.M.A.R.T.	**Auto** Disabled Enabled	Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures.	S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology.
32Bit Data Transfer	Disabled **Enabled**	This only affects BIOS accesses to the device. When enabled, BIOS interrupt 13h will make 32 bits I/Os that the chipset will convert internally to 2 consecutive 16 bits IOs.	Enable/Disable 32-bit Data Transfer.
ARMD Emulation Type	**Auto** Floppy Hard Disk	ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot up from media on an ARMD, it is required that you emulate boot up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device.	Select ARMD device emulation type by BIOS.

5.1.4.3 SuperIO Configuration sub-menu

Feature	Options	Description	Setup Help
Serial Port1 Address	Disabled **3F8/IRQ4** 3E8/IRQ4 2E8/IRQ4	Select the base address used by Serial Port1.	Allows BIOS to Select Serial Port1 Base Addresses.
Serial Port2 Address	Disabled **2F8/IRQ3** 3E8/IRQ4 2E8/IRQ4	Select the base address used by Serial Port2.	Allows BIOS to Select Serial Port2 Base Addresses.

5.1.4.4 USB Configuration sub-menu

Feature	Options	Description	Setup Help
	List USB device(s) detected.	This feature appears when the BIOS POST has detected USB device(s).	N/A, display only.
USB 2.0 Controller Mode	FullSpeed **HiSpeed**	Configures the USB 2.0 Controller in HiSpeed (480 Mbps) or FullSpeed (12 Mbps).	Configures the USB 2.0 controller in HiSpeed (480Mbps) or FullSpeed (12Mbps).
BIOS EHCI Hand-Off	Disabled **Enabled**	A workaround for OSes without EHCI hand-off support can be enabled/disabled. The EHCI ownership change should be claimed by an EHCI driver.	This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.
Legacy USB 1.1 HC Support	Disabled **Enabled**	BIOS support for Legacy USB 1.1 controller	Support USB1.1 HC.
Hotplug USB FDD Support	Disabled Enabled **Auto**	Normally, all boot devices must be detected during POST to be able to participate in the boot sequence. This feature can prevent the need to reboot the system if the USB FDD was plugged after POST.	A dummy FDD device is created that will be associated with the hotplugged FDD later. Auto option creates this dummy device only if there is no USB FDD present.
USB Mass Storage Device Configuration	N/A	Press Enter to go to sub screen "USB Mass Storage Device Configuration".	Configure the USB Mass Storage Class Devices.

5.1.4.4.1 USB Mass Storage Device Configuration sub-menu

Feature	Options	Description	Setup Help
USB Mass Storage Reset Delay	10 Sec **20 Sec** 30 Sec 40 Sec		Number of seconds POST waits for the USB mass storage device after start unit command.
Device #1	USB device description	Displays the 1st USB mass storage device description.	N/A, display only.
Emulation Type	**Auto** Floppy Forced FDD Hard Disk CDROM	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).
Device #2	USB device description	Displays the 2nd USB mass storage device description.	N/A, display only.

Feature	Options	Description	Setup Help
Emulation Type	**Auto** Floppy Forced FDD Hard Disk CDROM	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).
Device #3	USB device description	Displays the 3rd USB mass storage device description.	N/A, display only.
Emulation Type	**Auto** Floppy Forced FDD Hard Disk CDROM	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).
Device #4	USB device description	Displays the 4th USB mass storage device description.	N/A, display only.
Emulation Type	**Auto** Floppy Forced FDD Hard Disk CDROM	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).
Device #5	USB device description	Displays the 5th USB mass storage device description.	N/A, display only.
Emulation Type	**Auto** Floppy Forced FDD Hard Disk CDROM	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).
Device #6	USB device description	Displays the 6th USB mass storage device description.	N/A, display only.
Emulation Type	**Auto** Floppy Forced FDD Hard Disk CDROM	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).	If Auto, USB devices less than 530MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).

5.1.4.5 Onboard LAN Configuration sub-menu

Feature	Options	Description	Setup Help
Onboard LAN 1	**Enabled** Disabled	Individually Disable/Enable Onboard 82576 LAN interface.	Enable/Disable LAN interface. NOTE: This will not disable Management LAN access (KVM).
Option ROM	**Enabled** Disabled	Disable/Enable LAN 1 option ROM	Enabled: Initializes LAN Option ROM. Disabled: LAN Option ROM not used.
MAC		Display current MAC address of the interface.	N/A, display only.
Onboard LAN 2	**Enabled** Disabled	Individually Disable/Enable Onboard 82576 LAN interface.	Enable/Disable LAN interface. NOTE: This will not disable Management LAN access (KVM).
Option ROM	**Enabled** Disabled	Disable/Enable LAN 2 option ROM	Enabled: Initializes LAN Option ROM. Disabled: LAN Option ROM not used.
MAC		Display current MAC address of the interface.	N/A, display only.

5.1.4.6 ACPI Configuration sub-menu

Feature	Options	Description	Setup Help
Advanced ACPI Configuration	N/A	Press Enter to go to sub screen "Advanced ACPI Configuration".	Advanced ACPI Configuration settings. Use this section to configure additional ACPI options.
Chipset ACPI Configuration	N/A	Press Enter to go to sub screen "Chipset ACPI Configuration".	Chipset ACPI related Configuration settings.

5.1.4.6.1 Advanced ACPI Configuration sub-menu

Feature	Options	Description	Setup Help
ACPI Version Features	ACPI v1.0 ACPI v2.0 **ACPI v3.0**	Version 1.0 only supports RSDP pointers to 32-bit Fixed System Description Tables. Version 2.0 enables RSDP pointers to 64-bit Fixed System Description Tables. Version 3.0 improves processor, PCI Express and SATA support.	Enable RSDP pointers to 64-bit Fixed System Description Tables. Different ACPI version has some addition.
NUMA Support	**Enabled** Disabled	Enable/Disable NUMA (Non-Uniform Memory Access) support.	Enable : Efficiently execute software for NUMA aware OS. Disable : Better memory access performance for non-NUMA OS.

5.1.4.6.2 Chipset ACPI Configuration sub-menu

Feature	Options	Description	Setup Help
Energy Lake Feature	Enabled **Disabled**	Energy Lake feature (Intel Quick Resume Technology).	
APIC ACPI SCI IRQ	**Disabled** Enabled	IRQ9 if APIC is not used for SCI. IRQ20 is only available for SCI if APIC is enabled.	Enable/Disable APIC ACPI SCI IRQ.
High Performance Event Timer	Disabled **Enabled**	Enable/Disable High Performance Event Timer (HPET).	Enable / Disable

5.1.4.7 Remote Access Configuration sub-menu

Feature	Options	Description	Setup Help
Remote Access	Disabled **Enabled**	Configures console redirection. Disabling remote access will hide all related features in this sub-menu.	Select Remote Access type.
Serial port number	**COM1** COM2	Configures serial port for console redirection. Also used for Headless operation mode through ACPI.	Select Serial Port for console redirection. Make sure the selected port is enabled.
Base Address, IRQ	IO, IRQ	Displays the hardware address of the COM port used for the console.	N/A, display only.
Serial Port Mode	**115200 8,n,1** 57600 8,n,1 38400 8,n,1 19200 8,n,1 09600 8,n,1	Configures the serial Baud rate for the serial ports. 8 data bits, no parity and 1 stop bit parameters are fixed.	Select Serial Port settings.
Flow Control	Hardware Software **None**	Configures flow control for console redirection for both serial ports.	Select Flow Control for console redirection.
Redirection After BIOS POST	Disabled Boot Loader **Always**	Selects how the serial redirection done by the BIOS will operate after the POST.	Disable: Turns off the redirection after POST Boot Loader: Redirection is active during POST and during Boot Loader. Always: Redirection is always active. (Some OSs may not work if set to Always) [Enabled] - keep it [Disabled]- deactivate
Terminal Type	ANSI **VT100** VTUTF8	Configures the type of console emulation used for both serial ports.	Select the target terminal type.
VT-UTF8 Combo Key Support	Disabled **Enabled**	VT-UTF8 adds escape sequences for F1 to F12 and most other control keys on a keyboard.	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals.
Sredir Memory Display Delay	**No delay** Delay 1 Sec Delay 2 Sec Delay 4 Sec	Allows additional delay during POST to give time to display memory information by the terminal software.	Gives the delay in seconds to display memory information

Note:

BIOS doesn't change automatically the baud rate of the console redirection over LAN. The following commands must be executed on the KTC5520/EATX.

```
#ipmitool -H [ip address] -I lanplus -C 1 -U [user name] -P [password] sol
      set non-volatile-bit-rate [serial port speed]
#ipmitool -H [ip address] -I lanplus -C 1 -U [user name] -P [password]sol
      activate
```

5.1.4.8 Chipset Configuration sub-menu

Feature	Options	Description	Setup Help
CPU Bridge Configuration	N/A	Press Enter to go to sub screen "CPU Bridge Configuration".	Configure CPU Bridge features.
North Bridge Configuration	N/A	Press Enter to go to sub screen "North Bridge Configuration".	Configure North Bridge features.
South Bridge Configuration	N/A	Press Enter to go to sub screen "South Bridge Configuration".	Configure South Bridge features.

5.1.4.8.1 CPU Bridge Configuration sub-menu

Feature	Options	Description	Setup Help
CPU Revision	N/A	Display CPU revision ID.	N/A, display only.
Current QPI Frequency	N/A	Display Current QPI frequency speed in GT/s	N/A, display only.
Current Memory Frequency	N/A	Display current memory speed (DDR-3) in MHz	N/A, display only.

5.1.4.8.2 North Bridge Configuration sub-menu

Feature	Options	Description	Setup Help
NB Revision	N/A	Display Current NB revision ID.	N/A, display only.
Current QPI Frequency	N/A	Display Current QPI frequency speed in GT/s	N/A, display only.
Intel QuickData Technology DMA	Disabled **Enabled**	Intel QuickData Technology is a platform solution designed to maximize the throughput of server data traffic across a broader range of configurations and server environments to achieve faster, scalable, and more reliable I/O.	Intel QuickData Technology / Direct Memory Access configuration.
Intel QuickData Technology DCA	Disabled **Enabled**	Intel QuickData Technology is a platform solution designed to maximize the throughput of server data traffic across a broader range of configurations and server environments to achieve faster, scalable, and more reliable I/O.	Intel QuickData Technology / Direct Cache Access configuration.

5.1.4.8.3 South Bridge Configuration sub-menu

Feature	Options	Description	Setup Help
HDA Controller	**Enabled** Disabled	Enable/Disable intel HDA Audio controller device.	
SMBUS Controller	**Enabled** Disabled	Enable/Disable the SMBUS controller.	
Restore on AC Power Loss	**Power Off** Power On Last State	Board power state value after AC Power lost.	
SATA Master Break Event	**Disabled** Enabled	Serial ATA master activity will cause a break from C3/C6 state if enabled.	Serial ATA master activity will cause a break from C3/C6 state if enabled.

5.1.4.9 Virtualization Configuration sub-menu

Feature	Options	Description	Setup Help
SR-IOV Supported	**Disabled** Enabled	Enable or disable PCI-SIG I/O Virtualization (IOV).	
Intel VT-d	**Disabled** Enabled	Enable VT-d feature from INTEL. This will add DMAR table in ACPI to allows supporting OS to take advantage of the Virtualization Technology for Directed I/O.	
Coherency Support	**Disabled** Enabled	Enable / Disable Non-Isoch VTd Engine Coherency support.	Non-Isoch VTd Engine Coherency support.

5.1.4.10 Trusted Computing sub-menu

Feature	Options	Description	Setup Help
TCG/TPM SUPPORT	**No** Yes	Enable support for Trusted Platform Module. require to insert a TPM module to the TPM port.	Enable/Disable TPM TCG (TPM 1.1/1.2) support in BIOS
Execute TPM Command	Disabled **Enabled**	Enable or Disable access to TPM command from Operating System.	Enable(Activate)/ Disable(Deactivate) Command to TPM
Clearing the TPM [Press Enter]	Enter	Clear the TPM to Factory values. This will remove password and other information saved in the TPM.	
TPM Enable/Disable Status	N/A	Display the current configuration status of the TPM.	Display the current status of the TPM.
TPM Owner Status	N/A	Display the current configuration status of the TPM.	Display the current status of the TPM.

5.1.4.11 Watchdog sub-menu

Feature	Options	Description	Setup Help
Internal Watchdog	**Disabled** Enabled	Enable onboard watchdog to reset board if BIOS POST hang is detected.	Enable onboard watchdog to reset board if BIOS POST hang is detected.
POST timeout	30 sec **1 min** 2 min 4min	Delay until POST hang is detected.	Delay until POST hang is detected.
OS Load Watchdog	Enabled **Disabled**	Enable support for Onboard watchdog when executing Operating System.	Enable support for Onboard watchdog when executing Operating System.
OS Load Timeout	1 min 2 min **4min** 8min	Delay until OS Load hang is detected.	Delay until OS Load hang is detected.

5.1.4.12 Event Log Configuration sub-menu

Feature	Options	Description	Setup Help
View Event Log	Enter	View all unread events in the Event Log.	View all unread events on the Event Log.
Mark all events as read	Enter	Mark all unread events as read in the Event Log.	Mark all unread events as read.
Clear Event Log	Enter	Discard all events in the Event Log.	Discard all events in the Event Log.

5.1.4.13 Expansion Slots Configuration

Feature	Options	Description	Setup Help
Expansion Slot 1 (PCI)	**Enabled** Disabled	Enable/Disable the Expansion Slot Option ROM	Enabled: Initializes Expansion Slot Option ROM Disabled: Expansion Slot Option ROM not used.
Expansion Slot 2 (PCIe x4)	**Enabled** Disabled	Enable/Disable the Expansion Slot Option ROM	Enabled: Initializes Expansion Slot Option ROM Disabled: Expansion Slot Option ROM not used.
Expansion Slot 3(PCIe x8)	**Enabled** Disabled	Enable/Disable the Expansion Slot Option ROM	Enabled: Initializes Expansion Slot Option ROM Disabled: Expansion Slot Option ROM not used.
Expansion Slot 4 (PCIe x8)	**Enabled** Disabled	Enable/Disable the Expansion Slot Option ROM	Enabled: Initializes Expansion Slot Option ROM Disabled: Expansion Slot Option ROM not used.
Expansion Slot 5 (PCIe x8)	**Enabled** Disabled	Enable/Disable the Expansion Slot Option ROM	Enabled: Initializes Expansion Slot Option ROM Disabled: Expansion Slot Option ROM not used.
Expansion Slot 6 (PCIe x8)	**Enabled** Disabled	Enable/Disable the Expansion Slot Option ROM	Enabled: Initializes Expansion Slot Option ROM Disabled: Expansion Slot Option ROM not used.

5.1.5 Security menu

Feature	Options	Description	Setup Help
Supervisor Password	Installed Not Installed	Indicates the status of the Supervisor Password.	N/A, display only.
User Password	Installed Not Installed	Indicates the status of the User Password.	N/A, display only.
Change Supervisor Password	Enter	The supervisor password can be installed or changed.	Install or Change the password.
User Access Level	No Access **View Only** Limited Full Access	Controls the user access level to the BIOS Setup utility. Supervisor has full access to the BIOS Setup utility. No Access: Prevents user access to the setup utility. View Only: Allows read only user access to the setup utility i.e. none of the fields ca	LIMITED: allows only limited fields to be changed such as Date and Time. NO ACCESS: prevents User access to the Setup Utility. VIEW ONLY: allows access to the Setup Utility but the fields can not be changed. FULL: allows any field to be changed except the Supervisor password.
Change User Password	Enter	The user password can be installed or changed.	Install or Change the password.
Clear User Password	Enter	Immediately clears the User password.	Immediately clears the User password.
Password Check	**Setup** Always	Selects when the password is check during POST.	Setup: Check password while invoking setup. Always: Check password while invoking setup as well as on each boot.
Boot Sector Virus Protection	**Disabled** Enabled	Enable/Disable Boot Sector Virus Protection.	Enable/Disable Boot Sector Virus Protection.

5.1.6 Boot menu

Feature	Options	Description	Setup Help
Boot Settings Configuration	N/A	Press Enter to go to sub screen "Boot Settings Configuration".	Configure Settings during System Boot.
Boot Device Priority	N/A	Press Enter to go to sub screen "Boot Device Priority".	Specifies the Boot Device Priority sequence.
Hard Disk Drives	N/A	Press Enter to go to sub screen "Hard Disk Drives".	Specifies the Boot Device Priority sequence from available Hard Drives.
Removable Drives	N/A	Press Enter to go to sub screen "Removable Drives".	Specifies the Boot Device Priority sequence from available Removable Drives.
CD/DVD Drives	N/A	Press Enter to go to sub screen "CD/DVD Drives".	Specifies the Boot Device Priority sequence from available CD/DVD Drives.
USB Drives	N/A	Press Enter to go to sub screen "USB Drives".	Specifies the Boot Device Priority sequence from available USB Drives.
Network Drives	N/A	Press Enter to go to sub screen "Network Drives".	Specifies the Boot Device Priority sequence from available Network Drives.
Other Drives	N/A	Press Enter to go to sub screen "Other Drives".	Specifies the Boot Device Priority sequence from available Other Drives.
BIOS Boot Configuration Options	N/A	Press Enter to go to sub screen "BIOS Boot Configuration Options".	

5.1.6.1 Boot Settings Configuration sub-menu

Feature	Options	Description	Setup Help
Boots Graphic Adapter Priority	**Auto** Onboard VGA	Select which graphics controller to use as the primary boot device.	Select which graphics controller to use as the primary boot device.
Quiet Boot	**Disabled** Enabled	Disabled: Displays normal POST messages. Enabled: Displays OEM Logo instead of POST messages.	Disabled: Displays normal POST messages. Enabled: Displays OEM Logo instead of POST messages.
AddOn ROM Display Mode	**Force BIOS** Keep Current	Set display mode for Option ROM.	Set display mode for Option ROM.
Bootup Num-Lock	Off **On**	Select Power-on state for Num-Lock.	Select Power-on state for Numlock.
PS/2 Mouse Support	Disabled Enabled **Auto**	Select support for PS/2 Mouse.	Select support for PS/2 Mouse.
Wait For 'F1' If Error	Disabled **Enabled**	Stop BIOS boot and wait for F1 key when an error is detected.	Wait for F1 key to be pressed if error occurs.

5.1.6.1.1 Boot Device Priority sub-menu

Feature	Options	Description	Setup Help
1st Boot Device	Type: Boot device	Specifies the priority of the available boot sources. The list includes USB CD ROM, USB Hard Drive, Hard Drive and PXE. Other supported devices might be dynamically added to the list.	Specifies the boot sequence from the available devices. A device enclosed in parenthesis has been disabled in the corresponding type menu.
...			
N th Boot Device	Type: Boot device	Specifies the priority of the available boot sources. The list includes USB CD ROM, USB Hard Drive, Hard Drive and PXE. Other supported devices might be dynamically added to the list.	Specifies the boot sequence from the available devices. A device enclosed in parenthesis has been disabled in the corresponding type menu.

5.1.6.2 Hard Disk Drives sub-menu

Feature	Options	Description	Setup Help
1st Drive			Specifies the boot sequence from the available devices.
...			
N th Drive			Specifies the boot sequence from the available devices.

5.1.6.3 Removable Drives sub-menu

Feature	Options	Description	Setup Help
1st Drive			Specifies the boot sequence from the available devices.
...			
4th Drive			Specifies the boot sequence from the available devices.

5.1.6.4 CD/DVD Drives sub-menu

Feature	Options	Description	Setup Help
1st Drive			Specifies the boot sequence from the available devices.
...			
N th Drive			Specifies the boot sequence from the available devices.

5.1.6.5 USB Drives sub-menu

Feature	Options	Description	Setup Help
1st Drive			Specifies the boot sequence from the available devices.
...			
N th Drive			Specifies the boot sequence from the available devices.

5.1.6.6 Network Drives sub-menu

Feature	Options	Description	Setup Help
1st Drive			Specifies the boot sequence from the available devices.
...			
N th Drive			Specifies the boot sequence from the available devices.

5.1.6.7 Other Drives sub-menu

Feature	Options	Description	Setup Help
1st Drive			Specifies the boot sequence from the available devices.
...			
N th Drive			Specifies the boot sequence from the available devices.

5.1.7 System Management menu

Feature	Options	Description	Setup Help
Status of IPMC	Working or Not Working	Indicate if the BIOS was able to communicate with the IPMC.	N/A, display only.
BMC Synchronization	Disabled **Enabled**		Synchronize Baseboard Management Controller initialization with BIOS POST initialization.
Set LAN Configuration	N/A	Press Enter to go to sub screen "Set LAN Configuration".	InPut for Set LAN Configuration command. See IPMI 1.5 Spec, table 19.1 NOTE: - Each question in this group may take considerable amount of time. (direct access to IPMC)
IPMI Device and Firmware Information	N/A	Press Enter to go to sub screen "IPMI Device and Firmware Information".	View IPMI Device and Firmware Information
FRU Board Information	N/A	Press Enter to go to sub screen "FRU Board Information".	Display FRU board and product information, Display IPMC device and FW information.

5.1.7.1 Set LAN Configuration sub-menu

Feature	Options	Description	Setup Help
Channel Number		Each interface has a channel number that is used when configuring the channel and for routing messages between channels. The channel number assignments are described in IPMI Specification 1.5, table 6-1.	Enter Channel Number for SET LAN Config Command. Proper value below 16.
Channel Number Status	Valid or Invalid	Display Valid if IPMC support LAN Channel.	N/A, display only.
IP Address	N/A	Press Enter to go to sub screen "IP Address".	Enter for IP Address Configuration.
MAC Address	N/A	Press Enter to go to sub screen "MAC Address".	Enter for MAC Address Configuration.
Subnet Mask	N/A	Press Enter to go to sub screen "Subnet Mask".	Enter for Subnet Mask Configuration.
Gateway Address	N/A	Press Enter to go to sub screen "Gateway Address".	Enter for Gateway IP Address Configuration.
VLAN ID	N/A	Press Enter to go to sub screen "VLAN ID".	Enter for VLAN ID Configuration.
VLAN Priority	N/A	Press Enter to go to sub screen "VLAN Priority".	Enter for VLAN Priority Configuration.
Active LAN Channel Number	None **01** 02 Both	Each interface has a channel number that is used when configuring the channel and for routing messages between channels. The channel number assignments are described in IPMI Specification 1.5, table 6-1.	Enter Active LAN Channel Number for Set LAN Configuration Command.

5.1.7.1.1 IP Address sub-menu

Feature	Options	Description	Setup Help
Channel Number		Each interface has a channel number that is used when configuring the channel and for routing messages between channels. The channel number assignments are described in IPMI Specification 1.5, table 6-1.	Enter Channel Number for SET LAN Config Command. Proper value below 16.
Channel Number Status	Valid or Invalid	Display Valid if IPMC support LAN Channel.	N/A, display only.
IP Address Source	Static **DHCP**	Select IP address asource.	Select IP Address Source: Static or DHCP
Current IP Address	xxx.xxx.xxx.xxx	Display the current LAN configuration stored in IPMI NVRAM for IPMI LAN.	N/A, display only.
IP Address	Enter	This allows setting an IP Address for LAN configuration.	Enter for IP Address Configuration.

5.1.7.1.2 MAC Address sub-menu

Feature	Options	Description	Setup Help
Channel Number		Each interface has a channel number that is used when configuring the channel and for routing messages between channels. The channel number assignments are described in IPMI Specification 1.5, table 6-1.	Enter Channel Number for SET LAN Config Command. Proper value below 16.
Channel Number Status	Valid or Invalid	Display Valid if IPMC support LAN Channel.	N/A, display only.
Current MAC Address	xx.xx.xx.xx.xx.xx	Display the current MAC Address stored in IPMI NVRAM for IPMI LAN.	N/A, display only.

5.1.7.1.3 Subnet Mask sub-menu

Feature	Options	Description	Setup Help
Channel Number		Each interface has a channel number that is used when configuring the channel and for routing messages between channels. The channel number assignments are described in IPMI Specification 1.5, table 6-1.	Enter Channel Number for SET LAN Config Command. Proper value below 16.
Channel Number Status	Valid or Invalid	Display Valid if IPMC support LAN Channel.	N/A, display only.
IP Address Source	Static **DHCP**	Configure Subnet Mask from DHCP.	Select IP Address Source: Static or DHCP
Current Subnet Mask	xxx.xxx.xxx.xxx	Display the current Subnet Mask configuration stored in IPMI NVRAM for IPMI LAN.	N/A, display only.
Subnet Mask	Enter	This allows setting of a Subnet Mask for LAN configuration.	Enter for Subnet Mask Configuration.

5.1.7.1.4 Gateway Address sub-menu

Feature	Options	Description	Setup Help
Channel Number		Each interface has a channel number that is used when configuring the channel and for routing messages between channels. The channel number assignments are described in IPMI Specification 1.5, table 6-1.	Enter Channel Number for SET LAN Config Command. Proper value below 16.
Channel Number Status	Valid or Invalid	Display Valid if IPMC support LAN Channel.	N/A, display only.
IP Address Source	Static **DHCP**	Configure Gateway address from DHCP.	Select IP Address Source: Static or DHCP
Current Gateway Address	xxx.xxx.xxx.xxx	Display the current Gateway configuration stored in IPMI NVRAM for IPMI LAN.	N/A, display only.
Gateway Address	Enter	This allows setting an Gateway IP Address for LAN configuration.	Enter for Gateway IP Address Configuration.

5.1.7.1.5 VLAN ID sub-menu

Feature	Options	Description	Setup Help
Channel Number		Each interface has a channel number that is used when configuring the channel and for routing messages between channels. The channel number assignments are described in IPMI Specification 1.5, table 6-1.	Enter Channel Number for SET LAN Config Command. Proper value below 16.
Channel Number Status	Valid or Invalid	Display Valid if IPMC support LAN Channel.	N/A, display only.
802.1q VLAN ID Value		VLAN ID value in decimal. VLAN ID must be between 1 and 4094.	Enter VLAN ID value in decimal. VLAN ID must be between 1 and 4094.
Current 802.1q VLAN ID Value	xxx	Display the current 801.1q VLAN ID configuration stored in IPMI NVRAM for IPMI LAN.	N/A, display only.
VLAN Tagged Packets Status	Enabled or Disabled	Display the current status of the 801.1q VLAN tagged packets configuration stored in IPMI NVRAM for IPMI LAN.	N/A, display only.

5.1.7.1.6 VLAN Priority sub-menu

Feature	Options	Description	Setup Help
Channel Number		Each interface has a channel number that is used when configuring the channel and for routing messages between channels. The channel number assignments are described in IPMI Specification 1.5, table 6-1.	Enter Channel Number for SET LAN Config Command. Proper value below 16.
Channel Number Status	Valid or Invalid	Display Valid if IPMC support LAN Channel.	N/A, display only.
Current VLAN Priority Value	x	Display the current 801.1q VLAN Priority configuration stored in IPMI NVRAM for IPMI LAN.	N/A, display only.
802.1q VLAN Priority Value		VLAN Priority value in decimal. Proper value below 8.	Enter VLAN Priority value in decimal. Proper value below 8.

5.1.7.2 IPMI Device and Firmware Information sub-menu

Feature	Options	Description	Setup Help
Product ID	Product ID code (2 bytes)	Displays CPU blade product ID from IPMI "Get Device ID Command", byte 11:12. Least significant byte first.	N/A, display only.
IPMI Version	1.5 or 2.0	Displays IPMI Specification version.	N/A, display only.
Device ID	Varies	Displays IPMI device ID. OEM defined, IPMI Device ID has been assigned like this: Renesas H8S2148 = 1 Kontron PMM = 2 Renesas H8S2145 = 3 Renesas H8S2166 = 4 Renesas H8S2138 = 5 Renesas H8S2168 = 6	N/A, display only.
Device Revision	Varies	Displays IPMI device revision. OEM defined, specify the version of the IPMI Device controller.	N/A, display only.
Firmware Revision	Varies	Displays IPMI firmware version.	N/A, display only.
SMR Version	Varies	Displays SMR Firmware Version.	N/A, display only.
Aux Revision Info byte 0	Varies	Displays implementation specific auxiliary information from IPMI "Get Device ID Command", byte 16. The byte is displayed as a 2-digit hexadecimal number.	N/A, display only.
Aux Revision Info byte 1	Varies	Displays implementation specific auxiliary information from IPMI "Get Device ID Command", byte 14. The byte is displayed as a 2-digit hexadecimal number.	N/A, display only.
Aux Revision Info byte 2	Varies	Displays implementation specific auxiliary information from IPMI "Get Device ID Command", byte 15. The byte is displayed as a 2-digit hexadecimal number.	N/A, display only.
Aux Revision Info byte 3	Varies	Displays implementation specific auxiliary information from IPMI "Get Device ID Command", byte 16. The byte is displayed as a 2-digit hexadecimal number.	N/A, display only.

5.1.7.3 FRU Board Information sub-menu

Feature	Options	Description	Setup Help
Board Product Name	Board name	Displays the CPU blade product name.	N/A, display only.
Board Serial Number	Varies	Displays the CPU blade serial number.	N/A, display only.
Board Part Number	Varies	Displays the CPU blade part number.	N/A, display only.
Product Name	Board name	Displays the CPU blade product name.	N/A, display only.
Product Part/Model	Varies	Displays the CPU blade part/model number.	N/A, display only.
Product Version Number	Manufacturer PCB version	Displays the CPU blade PCB revision number.	N/A, display only.
Product Serial Number	Varies	Displays the CPU blade serial number.	N/A, display only.

5.1.8 Exit menu

Feature	Options	Description	Setup Help
Save Changes and Exit	Enter	Saves modified settings into non-volatile memory and reboots the system.	Exit system setup after saving the changes. F10 key can be used for this operation.
Discard Changes and Exit	Enter	Discards modifications to settings and reverts to the state when Setup was entered, then complete remaining POST.	Exit system setup without saving any changes. ESC key can be used for this operation.
Discard Changes	Enter	Discards modifications to settings and reverts to the state when Setup was entered.	Discards changes done so far to any of the setup questions. F7 key can be used for this operation.
Load Optimal Defaults	Enter	Loads the factory default settings.	Load Optimal Default values for all the setup questions. F9 key can be used for this operation.
Load Failsafe Defaults	Enter	Loads the factory failsafe settings. These settings could be used when the board is not operating correctly.	Load Failsafe Default values for all the setup questions. F8 key can be used for this operation.
Save CMOS in FLASH	**Disabled** Enabled	Saving CMOS memory content into Flash Memory will prevent loosing CMOS options when battery fails.	Saving CMOS memory content into Flash Memory will prevent loosing CMOS options when battery fails.

5.2 Boot Utilities

AMI Boot Utilities are: Boot Menu POP-UP

Boot Menu POP-UP is a boot screen that displays a selection of boot devices from which you can boot your operating system.

5.2.1 BOOT Menu POP-UP

Pressing <F11> (or <F3> from a Console Redirection terminal) displays the Boot Menu POP-UP with these options:

1 Load the operating system from a boot device of your choice.

2 Exit the Boot Menu POP-UP (with <ESC>) and load the operating system from the boot devices in the order specified in Setup.

The BOOT Menu POP-UP expands your boot options by letting you choose your boot device, which could be a hard disk, floppy disk, CDROM, Flash Disk, SCSI or LAN. You can select your boot device in Setup, or you can choose a different device each time you boot during POST by selecting your boot device in the Boot menu POP-UP.

5.3 Console Redirection (VT100 Mode)

The VT100 operating mode allows remote setup of the board. This configuration requires a remote terminal that must be connected to the board through a serial communication link.

5.3.1 Requirements

The terminal should emulate a VT100 or an ANSI terminal. Terminal emulation programs such as Telix©, HyperTherminal(Windows), minicom(Linux) or ProComm©(Windows) can also be used.

5.3.2 ANSI and VT100 Keystroke Mapping

Up	<ESC>[A
Down	<ESC>[B
Right	<ESC>[C
Left	<ESC>[D
Home	<ESC>[H
End	<ESC>[K
F1	<ESC>OP
F2	<ESC>OQ
F3	<ESC>OR
F4	<ESC>OT

5.3.3 VT-UTF8 Keystroke Mapping

The following "escape sequences" are defined in the "Conventions for Keys Not in VT100 Terminal Definition and ASCII Character Set" section of "Standardizing Out-of-Band Management Console Output and Terminal Emulation (VT-UTF8 and VT100+)", available for download at microsoft.com.

F1 Key	<ESC>1
F2 Key	<ESC>2
F3 Key	<ESC>3
F4 Key	<ESC>4
F5 Key	<ESC>5
F6 Key	<ESC>6
F7 Key	<ESC>7
F8 Key	<ESC>8
F9 Key	<ESC>9
F10 Key	<ESC>0
F11 Key	<ESC>!
F12 Key	<ESC>@
Alt Modifier	<ESC>^A
Control Modifier	<ESC>^C
Home Key	<ESC>h
End Key	<ESC>k
Insert Key	<ESC>+
Delete Key	<ESC>-
Page Up Key	<ESC>?
Page Down Key	<ESC>/

These "escape sequences" are supported by VT-UTF8 compliant terminal connections, such as Windows Server 2003 Emergency Management Services (EMS).

AMIBIOS8 Serial Redirection supports these key sequences under two configurations:

- "Terminal Type" setup question is set to "VT-UTF8"
- "Terminal Type" setup question is set to "VT100" or "ANSI" and "VTUTF8 Combo Key Support" setup question is set to "Enabled"

A. PCI IDSEL and Device Numbers

BUS#	DEV#	V. ID	D. ID	Funct. #	Description	PCI Description
00	00	8086	3406	0	Intel Corporation X58 I/O Hub to ESI Port (rev 13)	Host bridge
00	01	8086	3408	0	Intel Corporation X58 I/O Hub PCI Express Root Port 1 (rev 13)	PCI bridge
00	03	8086	340a	0	Intel Corporation X58 I/O Hub PCI Express Root Port 3 (rev 13)	PCI bridge
00	05	8086	340c	0	Intel Corporation X58 I/O Hub PCI Express Root Port 5 (rev 13)	PCI bridge
00	09	8086	340e	0	Intel Corporation X58 I/O Hub PCI Express Root Port 7 (rev 13)	PCI bridge
00	09	8086	3410	0	Intel Corporation X58 I/O Hub PCI Express Root Port 9 (rev 13)	PCI bridge
00	13	8086	342d	0	Intel Corporation X58 I/O Hub I/OxAPIC Interrupt Controller (rev 13)	PIC
00	14	8086	342e	0	Intel Corporation X58 I/O Hub System Management Registers (rev 13)	PIC
00	14	8086	3422	1	Intel Corporation X58 I/O Hub GPIO and Scratch Pad Registers (rev 13)	PIC
00	14	8086	3423	2	Intel Corporation X58 I/O Hub Control Status and RAS Registers (rev 13)	PIC
00	14	8086	3438	3	Intel Corporation X58 I/O Hub Throttle Registers (rev 13)	PIC
00	16	8086	3430	0	Intel Corporation X58 Chipset QuickData Technology Device (rev 13)	System peripheral
00	16	8086	3431	1	Intel Corporation X58 Chipset QuickData Technology Device (rev 13)	System peripheral
00	16	8086	3432	2	Intel Corporation X58 Chipset QuickData Technology Device (rev 13)	System peripheral
00	16	8086	3433	3	Intel Corporation X58 Chipset QuickData Technology Device (rev 13)	System peripheral
00	16	8086	3429	4	Intel Corporation DMA Engine (rev 13)	System peripheral
00	16	8086	342a	5	Intel Corporation DMA Engine (rev 13)	System peripheral
00	16	8086	342b	6	Intel Corporation DMA Engine (rev 13)	System peripheral
00	16	8086	342c	7	Intel Corporation DMA Engine (rev 13)	System peripheral
00	1a	8086	3a37	0	Intel Corporation 82801JI (ICH10 Family) USB UHCI Controller #4	USB Controller
00	1a	8086	3a39	1	Intel Corporation 82801JI (ICH10 Family) USB UHCI Controller #5	USB Controller
00	1a	8086	3a39	2	Intel Corporation 82801JI (ICH10 Family) USB UHCI Controller #6	USB Controller
00	1a	8086	3a3c	3	Intel Corporation 82801JI (ICH10 Family) USB2 EHCI Controller #2	USB Controller
00	1b	8086	3a3e	0	Intel Corporation 82801JI (ICH10 Family) HD Audio Controller	Audio Device
00	1d	8086	3a34	0	Intel Corporation 82801JI (ICH10 Family) USB UHCI Controller #1	USB Controller
00	1d	8086	3a35	1	Intel Corporation 82801JI (ICH10 Family) USB UHCI Controller #2	USB Controller
00	1d	8086	3a36	2	Intel Corporation 82801JI (ICH10 Family) USB UHCI Controller #3	USB Controller
00	1d	8086	3a3a	7	Intel Corporation 82801JI (ICH10 Family) USB2 EHCI Controller #1	USB Controller

BUS#	DEV#	V. ID	D. ID	Funct. #	Description	PCI Description
00	1e	8086	244e	0	Intel Corporation 82801 PCI Bridge (rev 90)	PCI bridge
00	1f	8086	3a16	0	Intel Corporation 82801JIR (ICH10R) LPC Interface Controller	ISA bridge
00	1f	8086	3a22	2	Intel Corporation 82801JI (ICH10 Family) SATA AHCI Controller	SATA controller
00	1f	8086	3a30	3	Intel Corporation 82801JI (ICH10 Family) SMBus Controller	SMBus
01	00	8086	10c9	0	Intel Corporation 82576 Gigabit Network Connection (rev 01)	Ethernet controller
01	00	8086	10c9	1	Intel Corporation 82576 Gigabit Network Connection (rev 01)	Ethernet controller
02	01	1a03	2000	0	ASPEED Technology, Inc. AST2000 (rev 10)	VGA compatible controller

B. BIOS Setup Error Codes

B.1 Bootblock Initialization Code Checkpoints

The Bootblock initialization code sets up the chipset, memory and other components before system memory is available. The following table describes the type of checkpoints that may occur during the bootblock initialization portion of the BIOS:

Checkpoint	Description
Before D1	Early chipset initialization is done. Early super I/O initialization is done including RTC and keyboard controller. NMI is disabled.
D1	Perform keyboard controller BAT test. Check if waiking up from power management suspend state. Save power-on CPUID value in scratch CMOS.
D0	Go to flat mode with 4GB limit and GA20 enabled. Verify the bootblock checksum.
D2	Disable CACHE before memory detection. Execute full memory sizing module. Verify that flat mode is enabled.
D3	If memory sizing module not executed, start memory refresh and do memory sizing in Bootblock code. Do additional chipset initialization. Re-enable CACHE. Verify that flat mode is enabled.
D4	Test base 512KB memory. Adjust policies and cache first 8MB. Set stack.
D5	Bootblock code is copied from ROM to lower system memory and control is given to it. BIOS now executes out of RAM.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. Main BIOS checksum is tested. If BIOS recovery is necessary, control flows to checkpoint E0. See Bootblock Recovery Code Checkpoints section of document for more information.
D7	Restore CPUID value back into register. The Bootblock-Runtime interface module is moved to system memory and control is given to it. Determine whether to execute serial flash.
D8	The Runtime module is uncompressed into memory. CPUID information is stored in memory.
D9	Store the Uncompressed pointer for future use in PMM. Copying Main BIOS into memory. Leaves all RAM below 1MB Read-Write including E000 and F000 shadow areas but closing SMRAM.
DA	Restore CPUID value back into register. Give control to BIOS POST (ExecutePOSTKernel). See POST Code Checkpoints section of document for more information.
E1-E8	
EC-EE	OEM memory detection/configuration error. This range is reserved for chipset vendors & system manufacturers. The error associated with this value may be different from one platform to the next. Refer to memory initialization ERROR CODE D.5

B.2 POST Code Checkpoints

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS. All POST Codes can be seen through the Web Management Interface in section Control.

Checkpoint	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
C0	Early CPU Init Start -- Disable Cache - Init Local APIC
C1	Set up boot strap processor Information
C2	Set up boot strap processor for POST
C5	Enumerate and set up application processors
C6	Re-enable cache for boot strap processor
C7	Early CPU Init Exit
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
24	Uncompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initializes different devices through DIM. See DIM Code Checkpoints section of document for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.
38	Initializes different devices through DIM. See DIM Code Checkpoints section of document for more information.

Checkpoint	Description
39	Initializes DMAC-1 & DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, ... etc.) successfully installed in the system and update the BDA, EBDA...etc.
50	Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7A	Initializes remaining option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested.
8C	Late POST initialization of chipset registers.
8D	Build ACPI tables (if ACPI is supported)
8E	Program the peripheral parameters. Enable/Disable NMI as selected
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A8	Prepare CPU for OS boot including final MTRR values.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module.
AB	Prepare BBS for Int 19 boot.
AC	End of POST initialization of chipset registers.
B1	Save system context for ACPI.
00	Passes control to OS Loader (typically INT19h).
61-70	OEM POST Error. This range is reserved for chipset vendors & system manufacturers. The error associated with this value may be different from one platform to the next.
DD-DE	OEM PCI init debug POST code during DIMM init, See DIM Code Checkpoints section of document for more information.

B.3 DIM Code Checkpoints

The Device Initialization Manager (DIM) gets control at various times during BIOS POST to initialize different system busses. The following table describes the main checkpoints where the DIM module is accessed:

Checkpoint	Description
2A	Initialize different buses and perform the following functions: Reset, Detect, and Disable (function 0); Static Device Initialization (function 1); Boot Output Device Initialization (function 2). Function 0 disables all device nodes, PCI devices, and PnP ISA cards. It also assigns PCI bus numbers. Function 1 initializes all static devices that include manual configured onboard peripherals, memory and I/O decode windows in PCI-PCI bridges, and noncompliant PCI devices. Static resources are also reserved. Function 2 searches for and initializes any PnP, PCI, or AGP video devices.
38	Initialize different buses and perform the following functions: Boot Input Device Initialization (function 3); IPL Device Initialization (function 4); General Device Initialization (function 5). Function 3 searches for and configures PCI input devices and detects if system has standard keyboard controller. Function 4 searches for and configures all PnP and PCI boot devices. Function 5 CONFIGURES all onboard peripherals that are set to an automatic configuration and configures all remaining PnP and PCI devices.
DD-DE	OEM PCI init debug POST code during DIMM init. DEh during BUS number assignment and DDh during ressource allocation, Hight byte is the BUS number.

While control is in the different functions, additional checkpoints are output to port 80h as a word value to identify the routines under execution. The low byte value indicates the main POST Code Checkpoint. The high byte is divided into two nibbles and contains two fields. The details of the high byte of these checkpoints are as follows:

HIGH BYTE XY

The upper nibble 'X' indicates the function number that is being executed. 'X' can be from 0 to 7.

0 = func#0, disable all devices on the BUS concerned.

1 = func#1, static devices initialization on the BUS concerned.

2 = func#2, output device initialization on the BUS concerned.

3 = func#3, input device initialization on the BUS concerned.

4 = func#4, IPL device initialization on the BUS concerned.

5 = func#5, general device initialization on the BUS concerned.

6 = func#6, error reporting for the BUS concerned.

7 = func#7, add-on ROM initialization for all BUSes.

8 = func#8, BBS ROM initialization for all BUSes.

The lower nibble 'Y' indicates the BUS on which the different routines are being executed. 'Y' can be from 0 to 5.

0 = Generic DIM (Device Initialization Manager).

1 = On-board System devices.

2 = ISA devices.

3 = EISA devices.

4 = ISA PnP devices.

5 = PCI devices.

B.4 Memory Initialization ERROR Code

Checkpoint	Description
E8	Memory Error - No memory installed.
EA	Memory Error - DDR3 Initialisation
EB	Memory Error - Memory test
ED	Memory Error - RDIMMs and UDIMMs are mixed
EE	Memory Error - Invalid Memory Population
EF	Memory Error - Memory structure problem

C. Software Update & Drivers

To update the software of your board or to get the latest drivers, visit the Kontron web site at: www.kontron.com. All the procedures are provided with the package you will download from the web site.

D. Troubleshooting

Before going through in-depth troubleshooting, make sure you are using the latest softwares. These software include the updates for the BIOS, Baseboard Management Controller & Web Management Interface. The latest versions are available from the Kontron web site at: www.kontron.com.

If you cannot resolve your problem on your own, pleas contact your Kontron technical support department.

E. Getting Help

If, at any time, you encounter difficulties with your application or with any of our products, or if you simply need guidance on system setups and capabilities, contact our Technical Support at:

North America	EMEA
Tel.: (450) 437-5682	Tel.: +49 (0) 8341 803 333
Fax: (450) 437-8053	Fax: +49 (0) 8341 803 339

If you have any questions about Kontron, our products, or services, visit our Web site at: www.kontron.com

You also can contact us by E-mail at:

North America: support@ca.kontron.com

EMEA: support-kom@kontron.com

Or at the following address:

North America	EMEA
Kontron Canada, Inc.	Kontron Modular Computers GmbH
4555, Ambroise-Lafortune	Sudetenstrasse 7
Boisbriand, Québec	87600 Kaufbeuren
J7H 0A4 Canada	Germany

E.1 Returning Defective Merchandise

Before returning any merchandise please do one of the following:

- Call

    1 Call our Technical Support department in North America at (450) 437-5682 and in EMEA at +49 (0) 8341 803 333. Make sure you have the following on hand: our Invoice #, your Purchase Order #, and the Serial Number of the defective unit.

    2 Provide the serial number found on the back of the unit and explain the nature of your problem to a service technician.

    3 The technician will instruct you on the return procedure if the problem cannot be solved over the telephone.

    4 Make sure you receive an RMA # from our Technical Support before returning any merchandise.

- E-mail

    1 Send us an e-mail at: RMA@ca.kontron.com in North America and at: orderprocessing@kontron-modular.com in EMEA. In the e-mail, you must include your name, your company name, your address, your city, your postal/zip code, your phone number, and your e-mail. You must also include the serial number of the defective product and a description of the problem.

E.2 When Returning a Unit

- In the box, you must include the name and telephone number of a contact person, in case further explanations are required. Where applicable, always include all duty papers and invoice(s) associated with the item(s) in question.
- Ensure that the unit is properly packed. Pack it in a rigid cardboard box.
- Clearly write or mark the RMA number on the outside of the package you are returning.
- Ship prepaid. We take care of insuring incoming units.

North America	EMEA
Kontron Canada, Inc.	Kontron Modular Computers GmbH
4555, Ambroise-Lafortune	Sudetenstrasse 7
Boisbriand, Québec	87600 Kaufbeuren
J7H 0A4 Canada	Germany

F. Recycling your Board

Contact you Kontron Technical Support Departement for the appropriate procedure on how to recycle your board.

G. Glossary

Acronyms	Descriptions
ATA	Advanced Technology Attachment
ATAPI	Advanced Technology Attachment Packet Interface
ATX	Advanced Technology Extended. Form factor for computer case.
BIOS	Basic Input/Output System
CD	Compact Disk
CDROM	(Same as CD-ROM). Compact Disk Read-Only Memory.
CD-ROM	(Same as CDROM). Compact Disk Read-Only Memory.
CMOS	Complementary Metal Oxide Semiconductor. Also refers to the small amount of battery (or capacitor) powered CMOS memory to hold the date, time, and system setup parameters.
CPU	Central Processing Unit. This sometimes refers to a whole blade, not just a processor component.
CRC	Cyclic Redundancy Check
CTS	Clear To Send
DDR3	DDR3 SDRAM or Double-Data-Rate three (3) Synchronous Dynamic Random Access Memory.
DHCP	Dynamic Host Configuration Protocol
DSP	Digital Signal Processing
DTC	Data Transfer Controller
DTR	Data Terminal Ready
DTS	Digital Thermal Sensor in IA32 processors.
DVD	Digital Video Disk
EATX	Extanded ATX
EEB	Enterprise Electronics Bay
ETH	Same as Ethernet.
Gb	Gigabit
GB	(Same as GByte) GigaByte.
GByte	(Same as GB) GigaByte.
GbE	Gigabit Ethernet
GHz	GigaHertz
LAN	Local Area Network
OS	Operating System
PCI	Peripheral Component Interconnect
PCI-32	Peripheral Component Interconnect 32 bits
PCI®	Peripheral Component Interconnect
PCIe	(Same as PCI-E). PCI-Express. Next generation I/O standard
PCI-E	(Same as PCIe). PCI-Express. Next generation I/O standard.
PIC	Programmable Interrupt Controller
PICMG	PCI Industrial Computer Manufacturers Group
PICMG®	PCI Industrial Computer Manufacturers Group
RAM	Random Access Memory
RS-232	(Same as RS232). Recommended Standard 232.

Acronyms	Descriptions
RS232	(Same as RS-232). Recommended Standard 232.
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SNTP	Simple Network Time Protocol
SOL	Serial Over LAN
SPD	Serial Presence Detect. A standardized way to automatically access information about a computer memory module.
SPI	Serial Peripheral Interface
SpeedStep	(Same as EIST). Enhanced Intel SpeedStep Technology.
SRAM	Static Random Access Memory
SSE2	Streaming SIMD Extension 2. SIMD is "Single Instruction, Multiple Data".
SSE3	Streaming SIMD Extension 3. SIMD is "Single Instruction, Multiple Data".
SSH	Secure SHell. A network protocol that allows data to be exchanged over a secure channel between two computers.
SSI	Server System Infrastructure
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
VGA	Video Graphics Array